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# Little Cracked Gasoline Expected From California Next 2 Years

By Paul Truesdell
N. P. N. Staff Writer

MOST refiners east of the Rocky Mountains have been following with more or less concern the reports coming out of California the past few months to the effect that the Pacific coast refiners, who up to date have been practicing cracking only to a very small extent, are putting in cracking units on a large scale.

The logical conclusion might be that the California refiners are putting themselves in position shortly to pour out a flood of cracked gasoline made from cheap California heavy crude and fuel oil, a large part of which would naturally find its way into the marketing territories of the Mid-Continent and eastern refiners, where it would undersell their products.

The California refiners are putting in cracking units to a considerable extent, it is true, but a canvass of the situation on the west coast makes it look as if the the menace of a flood of cracked gasoline from California, at least during the next two years, is a more apparent than real possibility.

Because the Californians are simply feeling their way in a careful, experimental fashion, to find out just what they can profitably do with cracking and the indications are that they have a considerable distance to go even before they have the answer to this question.

### Standard and Shell Pioneers

The Shell Co. of California, it is understood, has been cracking steadily on a considerable scale for several years and the Standard of California likewise has from time to time operated cracking stills, but the percentage of cracking done by these two companies in proportion to their straight distilling operations is extremely small. According to the Bureau of Mines report for December, production of cracked gasoline in that month was only about four hundredths of one percent of the straight run gasoline produced.

With a system of refining that makes it possible for the California refiners to turn out a great deal more gas oil and fuel oil than they can find a profitable market for, and with an enormous production of heavy, so-called non-refinable crude, which production can be increased at any time, it looks as if the stage was set for extensive cracking operations under ideal conditions.

However, after talking it over with most of the important California refiners, the conclusion is reached that the thing is not nearly so simple as it sounds. Several factors seem likely to retard the development of cracking on a large scale on the Pacific coast in the immediate future.

In the first place, the California refiners are under no economic necessity to crack. They have plenty of light crude oil, easily handled and yielding a gasoline of good quality in sufficient volume to handle their home and export trade and leave a surplus to be marketed in the form of finished motor fuel or tops in the markets reached from Atlantic and Gulf ports. Much of this gasoline is of high anti-knock value.

In the second place they have an excess of refining capacity right now over the needs of their market.

In the third place the mere time required for the construction of cracking plants would prevent any great amount of cracked gasoline coming on the market for at least a year. While some companies have cracking plants nearly ready to begin operations, others are just beginning their construction, others are only now placing orders or asking for bids on equipment, while still others are in process of negotiating with the proprietors of the various processes and making up their minds which best would serve their purpose.

In the fourth place, California refiners say that in entering the field of cracking they are up against all the problems that confront refiners in other parts of the country and most of them in aggravated form. These problems chiefly are:

### Some of the Problems

1—Difficulty of handling pressure distillate made from California crude to make a marketable product.

2—Excessive corrosion of equipment in the cracking operation itself.

3—Production of coke, which, they say, is even more difficult to market than it is in refining centers in other parts of the country.

As to the first problem, difficulty of treating pressure distillate, this would perhaps be about the same whether the charging stock used was fuel oil, gas oil or heavy crude. However, the latter two problems, in the opinion of most refiners interviewed, will lead the California refiners, when they begin cracking extensively, to stick to gas oil as a charging stock, rather than heavy fuel or heavy crude. Most of those who are building cracking plants expect to crack gas oil.

The chief difficulty confronting the refiners is that most California crudes are rich in sulfur. This, together with other characteristics, makes the pressure distillate difficult to treat, at least with the accepted acid and soda method. In order to make the gasoline of marketable color, remove the gum-forming compounds and other undesirable constituents, including corrosive sulfur compounds, refiners generally say a treat-

ment is necessary which results in a loss of as high as 25 to 30 per cent of the distillate and requires an excessive amount of acid according to standards of refiners in other fields.

These two factors make the treating of cracked distillate an exceedingly expensive step.

The corrosion of cracking equipment from hydrogen sulfide, due to the high sulfur content of the crude, is very severe. A chemist of one company told the writer that a battery of cracking stills, after operating for a little more than a year lost 25 per cent of the thickness of the metal, making it unsafe for further operation. In this particular case the loss of metal was nearly uniform throughout the shells of the stills. At other times the corrosion takes the form of pitting, which is more difficult to detect by drilling and which hence leads to greater danger of failure.

### Corrosion From Gas Oil Less

The corrosion factor is one of the chief reasons given by most refiners for their belief that cracking in California, at least for a long time to come, will be chiefly confined to gas oil. It is known that the distillates from a high sulfur bearing crude have a lesser concentration of sulfur than the residues, hence the corrosion of equipment in cracking gas oil would be less than in cracking the residual fuel or the heavy crude itself.

Another factor is the higher percentage of coke produced in cracking fuel oil or heavy crude, as compared with the cracking of gas oil. California consumes in general much less fuel for heating than other parts of the country.

Natural gas and oil are the chief fuels used, with a large amount of Diesel engine oil or gas oil. If cracking of fuel oil and heavy crude were to become general, it would be necessary to develop a market for coke, or it would in a short time bury the refineries. One company is now making briquettes out of coke and working hard to develop a market for this fuel, and is said to be meeting with some success.

Considerable has been said about the practicability of converting the fruit growers to the use of coke instead of gas oil in their "smudge pots," which are really little stoves set about in the orange and other fruit orchards to warm the air on chilly nights to prevent the trees from being injured by frost.

This change may be accomplished in time, but most of the refiners think it is rather remote because the investment of the fruit growers in their present smudge pots runs into big figures. It is estimated that these smudge pots cost $5 or $6 each on the average and every orange grower has at least two pots for every three trees in his orchard.

Further militating against the likelihood that the fruit growers in general could be sold on the idea of scrapping their present pots and buying new ones to burn coke is the idea held by some that it is the smoke blanket, rather than the actual heat furnished by the pots, that modifies atmospheric conditions and prevents frost.

It is likely that in time, however, the refineries themselves might profitably use the coke from their cracking stills under their own stills and boilers. Considerable work has been done in other parts of the country toward developing methods of burning pulverized coke in the refinery or using it on commercial stokers. This development may proceed rapidly in California, once cracking is started on a large scale.

Another factor that may work against the cracking on a large scale of heavy crude is the difficulty of getting the water out. Some of the heavy grades carry an exceedingly stubborn emulsion and danger results from charging to a cracking still oil containing even a small percentage of water.

Another factor that, it seems likely, will tend toward the development of gas oil cracking, rather than heavy oil cracking, is the possibility apparently offered by the sulfur dioxide process for pretreating gas oil before it goes to the cracking still.

According to Dr. Edeleanu, whose description of his process and its possibilities was published in the Feb. 24 issue of National Petroleum News, page 41, treatment of gas oil with sulfur dioxide will remove most of the constituents that cause corrosion in the equipment during the cracking operation and remove some of the resinous and tarry substances that go to form coke.

If this process proves practicable from all standpoints refiners believe it will be a valuable aid in minimizing the destruction of cracking equipment handling California oils. The sulfur dioxide treatment cannot be used successfully on residual oils and probably not on crude oils, Dr. Edeleanu says, because of the exceedingly high concentration of sulfur and other substances in those stocks.

The Shell Co. of California, which has been cracking for years, is understood to be operating on fuel oil. How the corrosion problem is handled by that company is not known. Possibly the only remedy used is the replacement of corroded equipment as fast as it becomes dangerous.

The Standard of California is very active just now in developng large scale cracking. This company took on the Burton process some years ago, abandoned it, it is understood, and for several years has been perfecting a process developed by R. W. Hanna, director in charge of refining operations.

### Standard Takes Dubbs License

This work was done with the consent and approval of the owners of the Burton patents, it is said, and it is further understood that the company enjoyed immunity under all the patents owned by the Patent Club. Recently, however, further development of the Hanna process is understood to have been menaced by the Dubbs interests, who threatened suit on the ground their patents were being infringed by certain features of the Hanna system.

At any rate, the Standard, against the urging of Patent Club members, took a license to operate the Dubbs process and is now building a Dubbs unit.

The severity of the corrosion problem encountered in cracking California oils may be judged from the length to which the Standard of California is going to prevent it. In the Dubbs plant now under construction at one of the Standard's refineries, the interior of the reaction chamber where the most active corrosion occurs is being electroplated with chromium. Chromium is recognized to be almost, if not entirely, non-reactive with hydrogen sulfide and considerable success has been met with in the use of chromium-steel alloys in equipment exposed to severe corrosive conditions.

Another interesting feature of the Dubbs unit being built by the Standard is that the reaction chamber is being built up of narrow steel rings alternately tongued and grooved. They fit together tightly and are riveted together, giving a container of great strength. The interior surface of the rings is finely machined to offer a favorable surface for plating with chromium. In addition to the Dubbs unit, the Standard is said to be building a number of units to operate on the Hanna system.

The cost of chromium plating is of course high and Standard regards its application as entirely experimental. However, all refiners the country over who have heard of the experiment are watching for the result with much interest. It may prove economical to make the initial heavy investment in view of

## Coming Meetings

**Wisconsin Independent Oil Jobbers Association, Hotel Pfister, Milwaukee, March 17.**

**American Association of Petroleum Geologists, The Baker Hotel, Dallas, Tex., March 25, 26, 27.**

**Petroleum Safety Council, Houston, Tex., latter part of March. Dates not set yet.**

**National Petroleum Marketers Association, Congress Hotel, Chicago, April 6, 7, 8.**

**Petroleum Division, American Chemical Society, Tulsa, April 5, 6, 7, 8, 9.**

**State Executives Club, Congress Hotel, Chicago, April 6, 7, 8.**

**American Oil Burner Association, Book-Cadillac Hotel, Detroit, Mich., April 6, 7, 8.**

**American Society of Mechanical Engineers, Oil and Gas Power Conference, Mayo Hotel, Tulsa, April 23, 24.**

**Association of Natural Gasoline Manufacturers, Mayo Hotel, Tulsa, May 5, 6.**

the prolonged life it gives the equipment in use.

The present status of the principal California refiners as regards cracking equipment, as nearly as can be learned is as follows:

**Status Of Cracking Plants**

Standard Oil Co. of California—Building one Dubbs unit and 10 Hanna units.

Shell Co. of California—Building eight Dubbs units at Wilmington refinery and four at Martinez refinery. About to build four more, location not yet decided.

Union Oil Co. of California—Building four Cross units.

General Petroleum Corp—Studying all processes, not yet committed.

Pan American Petroleum Co.—Operating 18 Black units.

Richfield Oil Co.—Just completed four Cross units, has ordered four more.

Associated Oil Co.—Studying all processes, not yet committed.

The development of cracking in the California fields to the same extent it has been developed in other refining centers was retarded by the discovery of the Los Angeles basin fields, the first of which, Huntington Beach, became a great factor with the discovery of the third sand in 1922. Along in 1920 and 1921, the California refiners became much interested in the possibilities of cracking and some of them installed cracking plants on a small scale.

Before they could conquer the problems confronting them as mentioned above and decide on a profitable method of operating, the rush of crude from the Los Angeles basin fields was upon them and all thought of cracking was banished from everybody's mind until a more convenient season.

With the production of crude slowly declining, California refiners are again turning their attention to the cracking field and trying to place themselves in a position to keep up their output of gasoline if necessary from a reduced supply of crude. Most of them think, however, that cracking will not become general enough to produce a very large volume of gasoline until light crude oil becomes scarcer and more expensive than it is now.

Dr. Gustav Egloff, in speaking before the refining section of the Petroleum Divison of the A. I. M. E. in New York Feb. 15, pointed to the huge supply of low gravity crude in California and dividing it in half, showing a gasoline yield of 50 per cent, showed how greatly the country's gasoline supply could be increased by cracking this heavy crude.

He estimated that California will produce 108,000,000 barrels of heavy crude in 1926 and that it has now 81,000,000 in storage or a total of 189,000,000 barrels. This, he said, would yield 50 per cent of gasoline or more than 94,000,000 barrels of gasoline.

All of which is acknowledged to be true, but the California refiners generally do not expect to be cracking much of this heavy crude while the light crude supply remains anywhere near the level of today.

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## Humble Looping Its West Texas Line

HOUSTON, March 1.—Humble Pipe Line Co., subsidiary of Humble Oil & Refining Co., is looping its pipe line east from Reagan county, Tex., to Comyn station connection with main trunk line. When completed, the Reagan county line will have capacity of 30,000 barrels daily.

President W. S. Farish, of the Humble Oil & Refining Co., announced the particulars of the new pipe line work today, at the annual meeting of the stockholders. It was also brought out that a 72-mile pipe line from the Piedras Pintas salt dome in Duval county will be laid when production of the new field warrants. The Gulf Coast terminal of this line would be at Ingleside, on Corpus Christi Bay.

Increased cracking plant capacity at the Humble's Baytown refinery, to be completed in April or May, will give the plant total capacity of 60,000 barrels daily, of which 26,000 to 28,000 barrels will be cracking capacity.

Humble's net earnings last year before federal taxes but after depletion and depreciation were announced as $24,873,789.82. Estimating federal taxes at approximately $2,225,000, the earnings after taxes would approximate $12.93 per share.

Stockholders approved the increase of capital stock from 1,750,000 shares to 3,000,000 shares of $25 par value, the increased amount to be sold to present stockholders at par under specified subscription right provisions, less 83,333 shares reserved for sale to employes.

### May Pass Up Spring Meeting

CHICAGO, March 1.—American Oil Men's Association, of which H. G. James is secretary, may not hold a convention this spring. Mr. James says his board of directors will meet in Chicago, March, 9, to finally decide the matter.

"If the organization holds a spring convention it will be different from those held before," Mr. James says. In the first place there will be no exhibits of equipment. All sessions will be executive business sessions. Members of the organization will be admitted to the meetings, but few others.

## Reeves County Test Is Showing Oil

HOUSTON, March 1.—History appears to have repeated itself in the discovery of a second oil field by the Chester R. Bunker interests of Fort Worth who brought in the World discovery well of northern Crockett county and who now have an oil showing in association with a gas blowout in northern Reeves county.

The Reeves county test is on the west side of the Pecos River and is northwest of the town of Pecos and almost due south of the Artesia, N. M. development. It found sand at 2905 to 2932 feet where a spray of oil is shown by the gas flow.

This test was drilled by the World Club No. 2, financed by 10,000 three-year subscriptions to a promotion oil paper at $10 per club membership. No. 1, which was similarly financed, resulted in the completion of a 30-barrel Crockett county well which was sold with surrounding acreage to the Humble-Marland partnership for $1,200,000 of which $350,000 was paid in cash and the remainder is to come from oil produced.

## Pump Manufacturer Dies of Apoplexy

LOUISIANA, MO.—J. G. Doty, founder and president of the Doty Pump Mfg. Co., St. Louis, died suddenly of apoplexy on Feb. 23, while visiting at the home of his daughter, Mrs. Druey Goodman here.

Previous to his organizing the company that bears his name two years ago, Mr. Doty for five years was district sales manager for the Dayton Pump & Equipment Co. of Louisiana.

He is survived by his widow and three married daughters.

## Eleven Companies Get Red River Funds

WASHINGTON, March 1.—A report showing the financial operations of the Red River oil field, located on the border between Oklahoma and Texas, has been submitted by the Secretary of the Interior to the Comptroller General for his final audit and approval.

This report shows that receipts amounted to $3,238,062.49. Of this amount, $1,908,756.66 is to be distributed to the various claimants recently awarded leases and permits, $1,324,305.83 accrues to the United States for royalties on production from the wells, income earned on royalty, and credit balance of wells adjudged the property of the government with $5000 reserved to meet various claims now pending.

Adjustment of the claims to the Red River field was made last September under the Act of March 4, 1923, when the Secretary of the Interior after extensive hearings announced the awards of oil and gas leases as well as the distribution of the impounded funds. While 18 applicants were awarded leases to tracts in the field, only 11 contained producing wells, giving the claimants shares in the $1,908,756.66 produced from them. The report submitted to the Comptroller General today gives a summary of the funds to be distributed to these claimants as follows:

Lone Star Refining Co., Kansas City; balance of impounded funds from 2 wells, $250,145.59.

General Oil Co., Houston, Texas; balance of impounded funds from 2 wells, $317,706.90.

Southwest Petroleum Co., Wichita Falls; balance of impounded funds from 2 wells, $96,650.48.

Buckeye Petroleum Co., Wichita Falls; balance of impounded funds from 1 well, $24,992.96.

W. F. Corts Drilling Co., Columbus, O.; balance of impounded funds from 1 well, $51,265.50.

Pacific Wyoming Oil Co., Denver,; balance of impounded funds from 1 well, $19,790.58.

A. E. Pearson et al, Oklahoma City; balance of impounded funds from 2 wells, $171,015.03.

Delta Oil Co., Wichita Falls; balance of impounded funds from 2 wells, $52,391.22.

Tom Testerman, Oklahoma City; balance of impounded funds from 1 well, $107,605.36.

Melish Consolidated Placer Oil Mining Association, Oklahoma City; balance of impounded funds from 1 well, $52,751.32.

Burke Divide Oil Co., Terre Haute, Indiana; balance of impounded funds from 10 wells, $764,441.72.

In making the awards the secretary found that no equitable claims existed on 531 acres of Red River upon which were located 10 wells with the result that they were adjudged the property of the government. The report shows that the balance from these wells amounted to $458,185.95, which will be turned into the federal treasury.

Operation of the field by the Interior Department ceased on Dec. 1, 1925, when the property was turned over to the lessees awarded leases and permits. As soon as the financial statement of operation is audited and approved by the Comptroller General, payments of the amounts to the various claimants will be certified and paid.

### Petroleum Safety Convention

TULSA, March 1.—The third annual convention of the Petroleum Safety Council of the Mid-Continent Oil & Gas Association will be held at Houston, Texas, March 15 to 20, in conjunction with the Petroleum Section of the National Safety Council, according to an announcement this week by Ray E. Miller, director.

Addresses will be delivered by W. S. Farish, recently elected president of the American Petroleum Institute, W. H. Cameron, managing director of the National Safety Council, Claude E. Connally, labor commissioner of Oklahoma and others.

H. W. Boggess of Kansas City is president of the safety organization.

HASTINGS, MICH.—Cool & Dooley Sales Co. recently reorganized and is now incorporated as the Hastings Gas & Oil Co. The old hotel building in which it previously did business, is being rebuilt with a two-story structuure. The upper floor will serve as a canopy for the filling station. Two electrically operated 10 gallon pumps and bulk storage have been installed.

# Refiners Talk Further Concerted Action Attacking Rates Into the Southeast

By J. C. Chatfield
N. P. N. Staff Writer

By Fast Wire Service

FORT WORTH, March 2

INTENSE interest in the railroad rate structure from the Mid-Continent field to the southern states was shown by executives as well as traffic managers at the opening session of the Western Petroleum Refiners' Association convention here this morning. Indications are that the meeting may result in a concerted attack on the rates by the association.

During the past year the refiners, association has had a policy of undertaking only rate cases where every member agreed. Sentiment is growing that a majority should rule and rate cases be carried on as formerly.

Recently major groups within the Mid-Continent agreed among themselves regarding proper differentials from the origin groups to Central Freight Association territory in the northeast and have filed a general rate case with a big weight of shippers complaining in concert. It was suggested at the opening meeting today that there is no reason why shippers cannot agree in a similar manner on proper origin differentials on shipments to the southeast as well, and thus file a general case to that area with the full weight of the refining industry in this area behind it.

### Suggestion Approved

This suggestion, made by A. C. Holmes traffic manager for the Empire Refineries, Inc., met with approval and a second meeting will be held before the convention adjourns.

The future traffic policy of the association will be put up to the board of directors in a later meeting.

At the present time Transcontinental Oil Co. has an application for rehearing on a case bearing on southeastern rates which was dismissed by the Interstate Commerce Commission. Ed. P. Byars has filed a case for the American Refining Co.

W. M. Priddy, president of the American, gave a forceful outline of the competitive situation in the southeast this morning when he showed how petroleum products are moving by water from the Gulf to Atlantic ports and eastern Gulf ports to be carried by tank truck inland for 100 miles and by short freight haul to other destinations. He suggested that refiners make an effort to show carriers that their revenue depends on giving a competitive rate for Mid-Continent refiners on a long overland haul.

Fayette B. Dow, Washington counsel, declared in his address that in 1924, 44 per cent of petroleum products or 33,000,000 tons exclusive of all crude oil and exports were shipped by American refiners to domestic consumers without using railroads. In two years coastwise shipments from Gulf ports have increased 50 per cent. He pointed out that friendly presentation of these facts to carriers should make them see the wisdom of giving proper rates to minimize the growing tendency to ship by water and pipe line.

Traffic managers asked the association to put in a tank car clearing house for the use of members in leasing surplus cars. A committee was voted to be appointed to canvass state tank car taxes and seek the removal of inequalities. It was shown that in Nebraska one company pays on the basis of an average movement of cars 100 miles per day while other companies must pay on a 50-mile haul basis.

### Discuss Excess Tax

There was the discussion of the excessive taxes charged by the states of Michigan, Louisiana and New Mexico. Roy Jones, president of Pan Handle Refining Co., presided at morning session due to the unavoidable absence of R. R. Irwin of White Eagle.

F. A. Pielsticker, vice president of the Skelly Oil Co. and president of the Western Petroleum Refiners' Association, and Fayette B. Dow, Washington counsel, in their addresses on the general economic situation of refiners and on the general freight rate situation gave the refiners the benefit of an intense study of current industry problems.

Concerted action by the entire Mid-Continent group of refiners on general freight structures was urged by Mr. Dow to supplement the activity of local groups within the field for rate advantages over competitors. He pointed out a danger of the petroleum industry, because of its popularly supposed prosperity, being singled out to bear an increased rate burden as a balance against possible reductions in the rates on agricultural products. The complete text of Mr. Dow's remarks will be published in the next issue of National Petroleum News.

After congratulating Mid-Continent refiners on the careful way in which they operated in 1925, Mr. Pielsticker, in his annual report, urged the utmost caution during the present year. He gave it as his opinion that 1926 will not be a boom year and that profits will be narrow. He urged investment in plant improvements rather than plant enlargements indicating that profits must come from efficiency of operation rather than in bulk production.

### President's Address

Following is the report of Mr. Pielsticker in detail:

"A year ago I said that 1925 would be what we made it: that if our operations were sane it would be a profitable year for us—if our operations did not conform to reason we would suffer from lack of profits. 1925 is history.

"Our operations were more intelligent than during previous years, consequently slightly profitable.

"1926 is now before us and I make the same statement. It is within our power to make it good or bad.

"During the year just closed a better feeling prevailed among the members; we had a better spirit of co-operation, more confidence in one another and I believe we profited by some of the mistakes of the past. We were willing to more fearlessly look cold and uninteresting facts in the face, and see situations as they were rather than as we wanted them.

"The Mid-Continent refiners have lots of troubles as have the other branches of the industry, however, the remedy for most of ours lies in our own hands. Over production is the one big sore spot. Most of the other troubles are but infections spreading from it. To apply to this wound the proper remedy we would be almost startled by the rapidity with which these spots would heal. The remedy is operations based upon reason. The day for haphazard operations has passed and the dawn of a new day is upon us. Keen competition has forced us to intensive study. Business in all lines is being conducted along more scientific lines and the oil industry must fall in step.

"Thus feeling, the association has directed its chief efforts this year to supplying to its members that information essential to intelligent operations. While the information is available to each of us, yet we haven't the time or facilities for gathering it or making the proper study and interpretations.

### Study of Operations

"The record for 1925 proves to my mind that we are beginning to make a more earnest study of our operations. Gasoline stocks in the Mid-Continent field at the end of 1925 are in our opinion entirely reasonable and not excessive, though a trifle larger than at the end of 1924, yet in days' supply, which is in the end the most correct measuring stick for stocks, they are under a

year ago. They are also under every year since 1918.

"To indicate that good has been accomplished, we need only to take into consideration the fact that gasoline stocks in the entire United States instead of being the lowest in days' supply in eight years are the highest in days' supply for every year since 1918, except one which was the year 1923, when the Bureau of Mines report indicates 58.52 days' supply of gasoline on hand, whereas at the end of 1925, the same report indicates approximately 55 days' supply. As against this the Mid-Continent field shows 20 days' supply.

"1925 has shown us the fallacy of carrying large gasoline stocks. In my opinion, excessive stocks indicate an unhealthy condition in any industry and it is gratifying to know that the Mid-Continent refiner is beginning to realize this in his business more each year. 1925 demonstrated our ability to adequately manufacture for current demand. During the month of July more gasoline was consumed than during any month in our history yet our drafts on gasoline stocks amounted to only 84,426,466 gallons and during that month 317 reporting refineries were operating at 86 per cent of capacity.

### Stocks Too Large

"Gasoline stocks in the country as a whole are too great, and operations should be curtailed until they are in keeping with a well-balanced situation. To maintain crude runs at the present level which brings about additions to the already excessive gasoline stocks is producing an artificial demand for crude that will force an increase in crude prices. Such an increase like the rain will fall upon the just as well as the unjust.

"For the coming year I would caution still more care.

"California is a sleeping giant. Its stocks and production are greatly in excess of the demand in its natural trade territory. It will move when the price reaches that level which makes it profitable. If our stocks at that time are in keeping with a known demand in impregnable territory we will not suffer greatly.

"It is my belief that 1926 will not be a boom year and that profits will be narrow.

"In my opinion it would be better to invest new capital or earnings in improvement in equipment thereby increasing efficiency rather than employing such capital in the increasing of capacities. When additional and certain outlets are secured expansion can not be condemned.

"When an association, company, or individual accomplishes everything it sets out to the millenium is truly here. We have fallen short as no doubt you have fallen short of the things you hoped to accomplish in your business. However, the association has made progress and I ask permission to call attention to some of our activities.

### Legislation

"A year ago now, almost every state legislature in the country was in session and nearly everyone of them apparently bent on enacting legislation inimical to business generally, and to the oil business especially. Nine states passed legislation establishing for the first time a gasoline sales tax. All save one fixed this tax at 2 cents per gallon. Seventeen states revised upward their gasoline tax already in existence. All save two or three of the balance of the states had programs for everything from gasoline tax to absolute price and business control. Most of the truly inequitable and grossly unjust legislation failed to pass.

"Our association can claim some credit for keeping legislation within the bounds that it was kept, principally by work done through and with the different state associations, and it was only by co-ordination of well-directed effort that the oil industry was permitted to exist in some of the states.

"I need not call your attention to the publicity work recently undertaken by the American Petroleum Institute through its public relations department under the direction of Judson Welliver, which has been two years in forming. Suffice to say that the work is now well organized and the department is functioning. Naturally, we can not expect any considerable immediate, apparent results, yet we are certain that the effort expended towards getting this work under way has been well worth while and we want to thank the membership for the co-operation they gave us in this direction.

"I would like to recommend an enlargement of the activities of the statistical department. Gathering statistical information to be presented in the proper form to the membership is distinctly the function of an association. I would ask that serious consideration be given by the members to the wisdom of the association gathering all types of statistics that will assist in more intelligently conducting our operations.

### Manufacturers' Committee

"Through the activity of the manufacturers' committee there was a splendid representation of the Western Petroleum Refiners' Association at the spring meeting of Committee D-2 of the American Society for Testing Materials held in Pittsburgh, in April, 1925. In addition to participating in the discussion of the various tests and testing methods the members took part in a joint meeting held Saturday, April 4, between Committee D-2 and the Advisory Committee on Testing Methods and Specifications for Petroleum and its Products, of the American Petroleum Institute. These committees took up the recommendations to be made to the Technical Committee on Lubricants and Liquid Fuels of the Federal Specifications Board on proposed revisions in the specifications of U. S. motor gasoline. It was agreed that in the distillation specifications for U. S. motor gasoline reference to initial boiling point, the 50 per cent point and the end point should be omitted and that the distillation specifications should be confined to a minimum of 17 per cent at 212 and 89 per cent at 392. Application for these changes has been made to the Federal Specifications Board.

"H. W. Camp was appointed representative of the Western Petroleum Refiners' Association on the Advisory Board to the Technical Committee on Lubricants and Liquid Fuels of the Federal Specifications Board.

"Committee D-2 of the American Society for Testing Materials held its fall meeting in Tulsa during the Petroleum Exposition and was a guest of the Western Petroleum Refiners Association. Manufacturers committee at a banquet served at the Mayo Hotel at the expense of some of the companies who cared to contribute to it.

"During the year the Manufacturers Committee worked out a suggested form for compiling information as to runs, stocks, etc., and transmitted the same to the National Petroleum News which adopted the suggestion and is now using them in their weekly reports on refinery operations.

"This committee urges closer co-operation with the Bureau of Mines in any work which it may be engaged upon in connection with refinery activities. It was thought to be more satisfactory to have the Bureau of Mines clear its requests for information and investigation through the office of the Western Petroleums Refiners' Association. Through this means it was thought that more representative results could be obtained in a shorter period of time than was possible in the past through the Bureau of Mines attempting to deal directly with each interested refiner. The technical program which will be heard tomorrow was arranged by this committee."

### Association Growth

It was announced in the report that the association has worked itself completely out of debt during the past year and that the membership has been increased by 20 per cent in the past two years since the present administration has been in charge. The organization has been active in assisting in the publicity campaign undertaken to dispel some of the unfair charges against the industry.

Mr. Pielsticker closed with a commendation of the group meetings which have been held under the direction of Howard Bennette, managing director, during the past year. He stated that these meetings or regional groups have been instrumental in creating a better spirit among competitors and the working out of a number of common problems of members of the small groups.

# Hurdle District Extended Into Crane County By Fifth Oil Well

By Paul Wagner
N. P. N. Staff Writer

FORT WORTH, March 1 PROGRESSIVELY better wells are being completed from east to west along a 12-mile trend in the Hurdle district of southwestern Upton and southeastern Crane counties.

The latest completion, which made 270 barrels by heads the first four hours, Feb. 24, carried production across the line from Upton county into Sec. 6, H. T. Sapp survey, Crane county. This well is the No. 1 Len Taylor of the Independent Oil & Gas Co., which topped the pay at 2038 feet. It was drilled in two feet.

Independent's new well is approximately six miles north of west of the McCamey & Johnson discovery well, in Sec. 8, which is pumping about 50 barrels daily, after being drilled into water at a deeper level and being plugged back to a total depth of 2232 feet. The discovery well is now operated by the Republic Production Co., which purchased a three-fourths interest in the discovery well and Hurdle district acreage last fall for $500,000, a part of which is to come from oil produced. Marland Oil Co. of Texas owns the remaining one-fourth interest.

Plateau Oil Co., and others, drilling on Union Land Co. acreage, about a mile southwest of the town of Hurdle and roughly six miles south of east of the McCamey & Johnson discovery, recently completed a small well after a shot at a total depth of 2234 feet. The well is now making about 10 barrels of oil and 10 barrels of water daily.

The three wells heretofore mentioned constitute the marker completions along a 12-mile east and west trend. Three other holes drilled closer to the McCamey & Johnson discovery have bearing on development, but throw very little light upon expectations of the area. These are the Kirby Petroleum Co.'s No. 1 Union Land Co. in Sec. 51, about a mile and a half south of the discovery well, and the two Burleson tests of the Dixie Oil Co., and the Independent Oil & Gas Co., approximately a quarter of a mile east of the discovery pumper.

Independent's Burleson is waiting to swab down fluid in the hole before shooting at a total depth of 2210 feet and the Dixie's Burleson is standing with 800 feet of oil in the hole, running 8¼ inch casing to set at 2080 feet, total depth 2219 feet.

Kirby Petroleum Co.'s test failed to get any oil showing in the lime formation at the approximate level of the McCamey & Johnson production on the Baker land or the pay level of the two Burleson wells. It was drilled on down for a deep test and had seven feet of oil saturated lime at 3015 feet, before going into sulphur water. It was still standing with a hole full of sulphur water at 3060 feet and drilling was going ahead.

Well data on the several tests follow:

### Bulletin

N. P. N. Fast Wire

HOUSTON, March 1.—Two more "heads" at intervals of about four to five hours have been made by Independent Oil & Gas Co.'s Taylor well on the Crane county line in the Hurdle district of west Texas. Each of these "heads" has approximated 120 barrels.

### Drilling Data on Hurdle District Wells

| Company—Well | Elevation | Top Lime | Top of Lime Above Sea Level | Pay Level |
|---|---|---|---|---|
| Republic Production Co. (McCamey & Johnson) | 2611 | 2085 | 526 plus | 2196–2232 |
| Plateau Oil Co. et al | 2533 | 2080 | 453 plus | 2206–2234 |
| Independent Oil & Gas Co. (Taylor-Crane Co.) | 2476 | 2038(?) | 438 plus | 2038–2040 |
| Independent Oil & Gas Co. (Burleson-Upton Co.) | 2616 | 2090 | 526 plus | 2168–2210 |
| Dixie Oil Co | 2629 | 2085 | 544 plus | 2188–2219 |
| Kirby Petroleum Co | 2529 | 2022 | 507 plus | 3015–3022 |

### Data Hard to Interpret

Attempts to adjust elevations with top of the lime levels and pay spots in the lime horizon result in all too vague data on which to base conclusions about the future of the field. Most all the wells behave in a manner usually attributed to edge completions, but it is significant that the six tests have shown somewhat similar characteristics; notwithstanding that wells toward the west end of the trend area have shown greatest production to date.

It has been suggested that the seven feet of oil saturated lime found in the Kirby test may be taken as an indication that a second producing horizon likely will be found in the territory at places where this lime is found to thicken on structurally high points. No other test in the Hurdle area has been drilled to the level of the 3015-foot show of the Kirby well.

Operators recall that a number of good wells were completed in the 2400-foot horizon of the Big Lake field, 40 miles east of the Hurdle district in Reagan county, after they had first produced gas. These completions came after development of the field had proceeded two-thirds of the way to the present stage of operations, the deeper 2900-3000 foot horizon yielding most of the Big Lake oil.

Another point yet to be decided in the Hurdle district is whether the wells completed to date are in the so-called "big lime" equivalent to the Reagan county main pay, or whether they produce from an upper horizon with the "big lime" several hundred feet beneath it. Many operators have correlated the Hurdle district producing level with the "big lime" of the Reagan county main pay, but geology has been too complex in the light of sub-surface work to permit of definite conclusions being reached.

A "beautiful" surface structure in this region is not necessarily to be reflected in the underground beds, hence geology must mark time in a sub-surface sense until more drilling provides definite keys for correlations. Geology did bring about the work that led to the drilling of the discovery well, but having accomplished that much it appears to have retired into the background until such time as a lot of drilling has clarified structural "keys" not clearly understood at the present time.

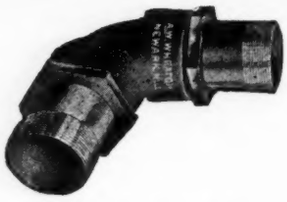
### Crockett County Operations

Operations in Crockett county have shown no change from their status of a week ago. In the World well prospect area, the Humble Oil & Refining Co. test on the Sorg, southeast of the Powell discovery, is a small well at total depth of 2653 feet. The Nos. 1 and 2 Powell of the Humble-Marland partnership are producing 21 and 24 barrels, respectively, and No. 3 is testing for possible deeper pay.

The No. 1 Powell of Cromwell et al, east of the original Humble-Marland wells, is waiting for a shot. It is now good for a pumper.

West of south of these wells about 12 miles, the J. C. Cooke et al No. 1 Todd ranch test, which has been provisionally sold to The Texas Co., as reported in this periodical last week, is shut down waiting orders. It is generally rated as a gasser at 1705 feet, but shows salt water and 1000 feet of oil in the hole.

SPOKANE, WASH.—H. Earl Clack Co. recently completed remodeling its grease plant here, doubling its capacity. The company manufactures axle, cup, transmission and special industrial greases, according to Gardner Davis, manager.



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# Wheaton

# Compilation Of Mid-Continent Refinery Operations

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National Petroleum News

# Fuel Oil Stocks Greatly Reduced At 124 Mid-Continent Plants

Special Wire Service
TULSA, March 2

STOCKS of fuel oil at 124 refineries in the Mid-Continent field were reduced 6,000,000 gallons during the week ended Feb. 26 according to reports gathered by National Petroleum News. Stocks at all plants at the end of the week amounted to 85,798,983 gallons, a reduction of 19,000,000 gallons from the stocks of 104,888,363 gallons held by the same companies a month ago on Jan. 22.

Gas oil stocks increased approximately 2,000,000 gallons the first increase in several weeks. Total stocks were reported as being 51,448,701 gallons. The steady decrease in stocks of stove distillate which has been in progress since Jan. 1 was not halted. Shipments were greater than production by 1,200,000 gallons with the result that stocks were cut to 3,773,318 gallons representing around nine days' supply at the current rate of shipment.

Shipments of kerosene fell off 870,000 gallons as compared with the preceding week to 4,128,565 gallons. At the same time refiners increased their production roughly 300,000 gallons. As a result kerosene stocks were increased for the first time in recent weeks. The increase was a little less than 600,000 gallons bringing total stocks to 8,035,177 gallons representing about 13 days' supply at the current rate of shipment.

North Texas refiners drew slightly on their stocks of gasoline during the past week due to export shipments. All other groups showed the usual winter increases and stocks at all plants climbed 4,000,000 gallons to 93,429,393 gallons representing 24 days' supply at the present rate of shipments.

### Summary for the Month

Production and shipments all reporting refineries, for four weeks ended Feb. 26. Change in stocks figured from Jan. 29.

| | Gallons |
|---|---|
| **Gasoline** | |
| Production | 118,325,292 |
| Shipments | 108,052,180 |
| Net change in stocks | +10,773,112 |
| Ratio sales to production | 91.3% |
| **Kerosene** | |
| Production | 19,248,378 |
| Shipments | 19,580,358 |
| Net change in stocks | —331,980 |
| Ratio sales to production | 101.7% |
| **Stove Distillate** | |
| Production | 6,602,203 |
| Shipments | 12,338,843 |
| Net change in stocks | —5,736,640 |
| Ratio sales to production | 186.9% |
| **Gas Oil** | |
| Production | 22,659,586 |
| Shipments | 21,907,204 |
| Net change in stocks | +752,382 |
| Ratio sales to production | 96.7% |
| **Fuel Oil** | |
| Production | 105,484,251 |
| Shipments | 124,457,483 |
| Net change in stocks | —18,973,232 |
| Ratio sales to production | 118.0% |

## Mid-Continent Refinery Operations Week Ended Feb. 26 (By Fast Wire)

| | Kansas | %Change Previous Week | Oklahoma | %Change Previous Week | No. & Cent. Texas | %Change Previous Week | No. La.-Ark. | %Change Previous Week | Total | %Change Previous Week | Totals Week Ended Jan. 29 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Plants Reporting | 23 | | 46 | | 41 | | 14 | | 124 | | 124 |
| Daily Cap. (Bbls.) | 98,200 | | 165,900 | | 144,300 | | 51,700 | | 460,100 | | 460,100 |
| Da. Av. Crude Runs | 47,104 | + 0.2 | 99,958 | — 4.2 | 64,993 | + 7.8 | 37,122 | + 3.5 | 249,177 | + 0.7 | 248,650 |
| Da. Av. Other Oils | 3,577 | —13.8 | 360 | —43.0 | 2,074 | —42.9 | 987 | +61.3 | 6,998 | —22.5 | 10,572 |
| **GASOLINE—Gallons** | | | | | | | | | | | |
| Stocks Feb. 19 | 12,564,861 | | 54,038,563 | | 17,186,505 | | 5,249,709 | | 89,039,638 | | 77,537,352 |
| Prod. 2-19 to 2-26 | 7,371,846 | + 0.1 | 14,104,640 | + 0.1 | 6,914,768 | + 7.3 | 2,679,012 | +14.4 | 31,070,266 | + 2.8 | 30,650,455 |
| Ship. 2-19 to 2-26 | 6,244,097 | + 0.9 | 11,086,208 | — 7.1 | 7,012,010 | — 0.7 | 2,338,196 | +19.4 | 26,680,511 | — 1.7 | 25,031,526 |
| Stocks Feb. 26 | 13,692,610 | + 9.0 | 57,056,995 | + 5.6 | 17,089,263 | — 0.6 | 5,590,525 | + 6.5 | 93,429,393 | + 4.9 | 83,156,281 |
| Ratio Sales to Prod. | 84.7% | | 78.6% | | 101.4% | | 87.3% | | 85.9% | | 81.7% |
| **KEROSENE—Gallons** | | | | | | | | | | | |
| Stocks Feb. 19 | 1,157,241 | | 4,565,452 | | 1,379,549 | | 309,369 | | 7,411,611 | | 8,189,021 |
| Prod. 2-19 to 2-26 | 1,021,050 | + 5.4 | 2,173,053 | + 2.2 | 1,106,285 | + 6.7 | 451,743 | +44.8 | 4,752,131 | + 6.9 | 5,700,833 |
| Ship. 2-19 to 2-26 | 997,792 | + 2.2 | 1,558,279 | —39.8 | 1,176,866 | +21.5 | 395,628 | —15.1 | 4,128,565 | —17.4 | 5,522,697 |
| Stocks Feb. 26 | 1,180,499 | + 2.0 | 5,180,226 | +13.5 | 1,308,969 | — 5.1 | 365,484 | +18.1 | 8,035,177 | + 8.4 | 8,367,157 |
| Ratio Sales to Prod. | 97.7% | | 71.7% | | 106.4% | | 87.6% | | 86.9% | | 96.9% |
| **STOVE DISTILLATE—Gallons** | | | | | | | | | | | |
| Stocks Feb. 19 | 1,221,957 | | 3,427,484 | | 311,402 | | 22,428 | | 4,983,271 | | 11,149,113 |
| Prod. 2-19 to 2-26 | 1,044,144 | +70.8 | 389,359 | —18.2 | 237,884 | —24.3 | 16,884 | +152.8 | 1,688,271 | +19.9 | 1,695,702 |
| Ship. 2-19 to 2-26 | 1,357,529 | +26.4 | 1,149,379 | —19.8 | 358,010 | — 8.7 | 33,306 | +257.7 | 2,898,224 | — 0.4 | 3,334,857 |
| Stocks Feb. 26 | 908,572 | —25.6 | 2,667,464 | —22.2 | 191,276 | —38.6 | 6,006 | —73.2 | 3,773,318 | —24.4 | 9,509,958 |
| Ratio Sales to Prod. | 130.0% | | 295.2% | | 150.5% | | 197.3% | | 171.7% | | 196.7% |
| **GAS OIL—Gallons** | | | | | | | | | | | |
| Stocks Feb. 19 | 3,559,028 | | 33,887,853 | | 6,056,174 | | 5,912,845 | | 49,415,900 | | 52,685,719 |
| Prod. 2-19 to 2-26 | 1,524,065 | + 9.8 | 2,239,016 | +34.4 | 376,522 | +86.7 | 2,162,348 | +15.8 | 6,301,951 | +23.0 | 7,028,993 |
| Ship. 2-19 to 2-26 | 620,641 | —60.2 | 1,199,427 | —22.0 | 370,681 | —50.7 | 2,078,401 | + 4.5 | 4,269,150 | —26.9 | 9,018,393 |
| Stocks Feb. 26 | 4,462,452 | +25.4 | 34,927,442 | + 3.1 | 6,062,015 | + 0.1 | 5,996,792 | + 1.4 | 51,448,701 | + 4.1 | 50,696,319 |
| Ratio Sales to Prod. | 40.7% | | 53.6% | | 98.4% | | 96.1% | | 67.7% | | 128.3% |
| **FUEL OILS—Gallons** | | | | | | | | | | | |
| Stocks Feb. 19 | 10,741,658 | | 48,451,570 | | 22,533,702 | | 10,079,852 | | 91,806,782 | | 104,888,363 |
| Prod. 2-19 to 2-26 | 3,713,040 | —12.7 | 7,988,039 | —10.5 | 8,012,384 | + 1.3 | 6,282,741 | + 8.0 | 25,996,204 | — 3.4 | 26,254,128 |
| Ship. 2-19 to 2-26 | 3,639,057 | —26.2 | 10,453,369 | +24.3 | 9,260,797 | + 4.5 | 8,650,780 | — 9.0 | 32,004,003 | + 0.9 | 26,370,276 |
| Stocks Feb. 26 | 10,815,641 | + 0.7 | 45,986,340 | — 5.1 | 21,285,289 | — 5.5 | 7,611,813 | —23.5 | 85,798,983 | — 6.5 | 104,772,215 |
| Ratio Sales to Prod. | 98.0% | | 130.9% | | 115.6% | | 137.7% | | 123.1% | | 100.4% |

# Crude Production by Districts

Daily average gross crude output of United States, by fields, for week ending with dates given below, as compiled by American Petroleum Institute

National Petroleum News

### OKLAHOMA

| | Feb. 27 | Feb. 20 |
|---|---|---|
| North Braman | 2,150 | 2,150 |
| South Braman | 8,150 | 8,350 |
| Blackwell | 3,250 | 3,350 |
| Hubbard | 2,000 | 2,150 |
| Thomas | 8,600 | 9,350 |
| Tonkawa | 44,250 | 41,950 |
| Garber | 26,350 | 26,600 |
| Burbank | 44,500 | 44,750 |
| Osage, outside Burbank | 33,200 | 33,000 |
| Watchorn | 2,800 | 2,850 |
| Cushing | 22,500 | 22,500 |
| Yale Jennings | 15,650 | 11,450 |
| Davenport | 21,150 | 21,800 |
| Bristow-Slick | 31,850 | 31,950 |
| North Okmulgee | 18,400 | 18,500 |
| Lyons-Deaner | 4,350 | 4,300 |
| Stroud | 2,850 | 2,850 |
| Cromwell | 19,700 | 19,600 |
| Papoose | 14,250 | 15,100 |
| Wewoka | 17,250 | 15,750 |
| Duncan district | 7,600 | 7,500 |
| Graham | 9,300 | 9,200 |
| Fox | 3,750 | 3,600 |
| Healdton | 15,000 | 15,000 |
| Hewitt | 12,300 | 12,500 |
| Others | 64,250 | 63,900 |
| Total Oklahoma | 455,400 | 450,000 |
| Increase | | 5,400 |

### KANSAS

| | Feb. 27 | Feb. 20 |
|---|---|---|
| Florence-Covert | 1,800 | 1,900 |
| Peabody-Elbing | 4,650 | 4,850 |
| Eldorado-Towanda | 14,150 | 14,150 |
| Augusta-Fox-Bush | 5,000 | 5,050 |
| Rainbow Bend | 5,100 | 4,850 |
| Russell | 5,100 | 5,100 |
| Greenwood County | 41,500 | |
| Others | 25,950 | 25,550 |
| Total Kansas | 103,250 | 102,600 |
| Increase | | 650 |

### NORTH LOUISIANA

| | Feb. 27 | Feb. 20 |
|---|---|---|
| Homer | 5,900 | 5,850 |
| Haynesville | 10,350 | 10,350 |
| Caddo, light | 9,100 | 8,850 |
| Caddo, heavy | 2,300 | 2,250 |
| De Soto Red River | 3,800 | 3,950 |
| Elm Grove | 550 | 600 |
| Bellevue | 2,300 | 2,350 |
| Cotton Valley | 8,250 | 8,100 |
| Urania | 5,600 | 2,300 |
| Total North Louisiana | 48,150 | 44,600 |
| Increase | | 3,550 |

### ARKANSAS

| | | |
|---|---|---|
| El Dorado | 7,700 | 7,550 |
| Smackover, light | 18,950 | 18,850 |
| Smackover, heavy | 137,250 | 140,400 |
| Stephens | 1,500 | 1,500 |
| Nevada | 1,600 | 1,600 |
| Total Arkansas | 167,000 | 169,900 |
| Decrease | | 2,900 |

### SOUTHWEST TEXAS

| | | |
|---|---|---|
| Luling | 21,600 | 21,200 |
| Mirando | 5,700 | 5,600 |
| Somerset | 2,300 | 2,250 |
| Lytton Springs | 7,250 | 7,150 |
| Piedras Pintas | 1,250 | 700 |
| Others | 800 | 750 |
| Total Southwest Texas | 38,900 | 37,650 |
| Increase | | 1,250 |

### GULF COAST

| | | |
|---|---|---|
| Goose Creek | 9,600 | 8,550 |
| Hull | 15,250 | 15,250 |
| Saratoga | 1,300 | 1,250 |
| Blue Ridge | 800 | 900 |
| Damon Mound | 1,050 | 1,000 |
| Batson | 4,500 | 1,150 |
| West Columbia | 9,200 | 9,150 |
| Humble | 4,900 | 4,900 |
| Pierce Junction | 1,050 | 1,300 |
| Sour Lake | 4,500 | 4,800 |
| Spindletop | 2,850 | 4,150 |
| Orange County | 11,850 | 13,600 |
| Edgerly | 1,150 | 600 |
| Evangeline | 1,100 | 1,050 |
| Vinton | 6,600 | 6,600 |
| Lockport | 1,650 | 1,600 |
| South Liberty | 7,750 | 7,700 |
| Big Creek | 1,400 | 1,000 |
| Boling | 5,400 | 3,950 |
| Others | 1,700 | 1,600 |
| Total Gulf Coast | 93,600 | 90,100 |
| Increase | | 3,500 |

### NORTH TEXAS

| | Feb. 27 | Feb. 20 |
|---|---|---|
| Burkburnett | 12,350 | 12,300 |
| Electra | 18,300 | 16,150 |
| Iowa Park and K-M-A | 5,500 | 5,450 |
| Wilbarger | 11,400 | 12,150 |
| Panhandle | 5,600 | 3,050 |
| Petrolia | 300 | 450 |
| Archer County | 27,300 | 26,200 |
| Total North Texas | 79,700 | 76,650 |
| Increase | | 3,050 |

### EAST CENTRAL TEXAS

| | | |
|---|---|---|
| Mexia | 13,350 | 13,150 |
| Currie | 1,100 | 1,050 |
| Richland | 2,300 | 2,300 |
| Corsicana-Powell | 32,600 | 32,200 |
| Wortham | 10,800 | 10,500 |
| Total East Central Texas | 60,150 | 59,200 |
| Increase | | 950 |

### WEST CENTRAL TEXAS

| | | |
|---|---|---|
| Stephens County | 12,750 | 12,750 |
| Eastland County | 5,900 | 5,900 |
| Desdemona | 2,050 | 2,050 |
| Young County | 8,250 | 7,950 |
| Palo Pinto County | 400 | 400 |
| Callahan County | 4,500 | 4,450 |
| Shackelford County | 2,600 | 2,300 |
| Reagan County | 31,300 | 28,700 |
| Others | 5,300 | 5,100 |
| Total West Central Texas | 73,050 | 69,600 |
| Increase | | 3,450 |

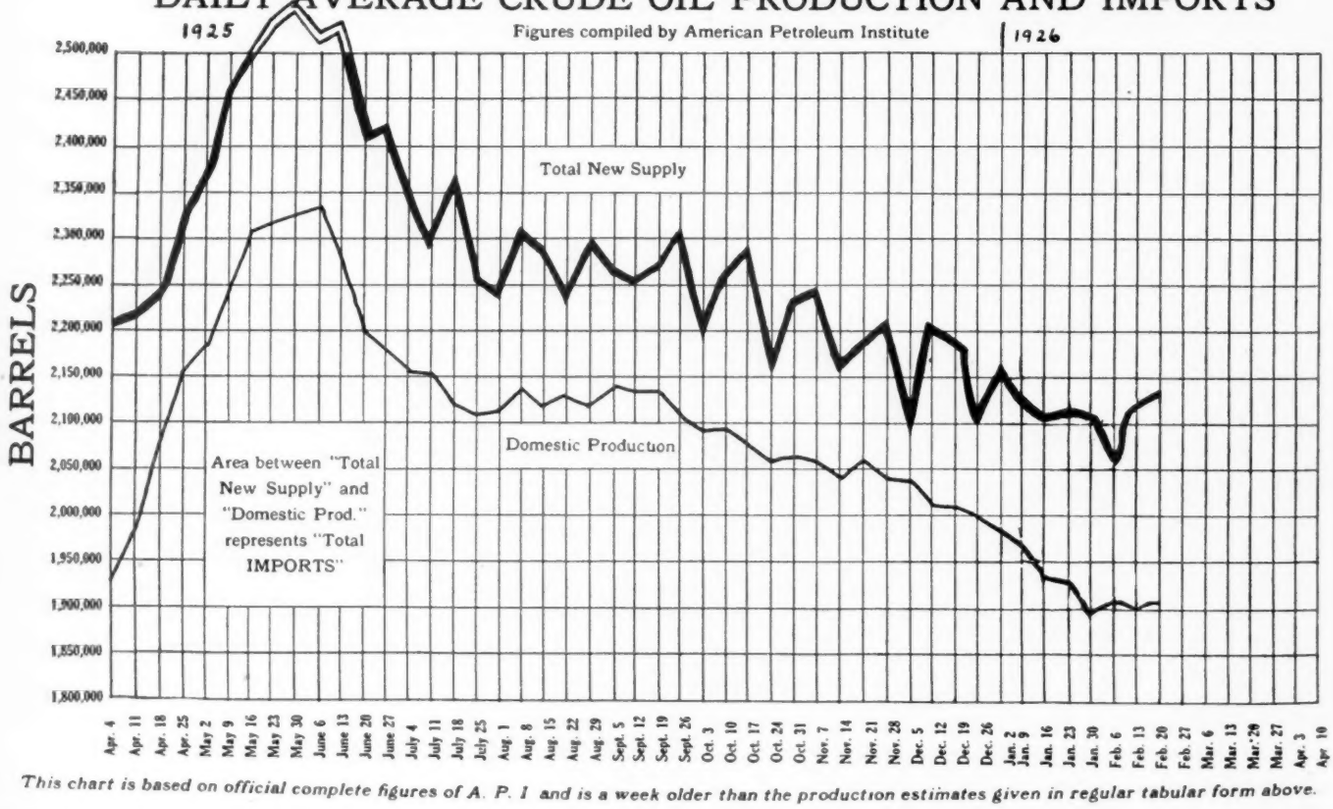
### ROCKY MOUNTAIN

### WYOMING

| | | |
|---|---|---|
| Salt Creek | 57,100 | 53,950 |
| Grass Creek | 2,750 | 2,750 |
| Elk Basin | 650 | 550 |
| Big Muddy | 3,350 | 3,350 |
| Lost Soldier | 4,250 | 4,200 |
| Rock River | 3,100 | 2,750 |
| Teapot Dome | 1,150 | 1,700 |
| Others | 4,650 | 4,550 |
| Total Wyoming | 77,000 | 73,800 |
| Increase | | 3,200 |

(Continued on page 28)

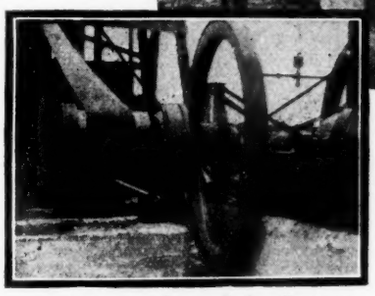
## DAILY AVERAGE CRUDE OIL PRODUCTION AND IMPORTS




*This chart is based on official complete figures of A. P. I and is a week older than the production estimates given in regular tabular form above.*

# A Black Bear Is A Good Investment

35 H.P. Black Bear Engine
In The Texas Field



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   With Black Bear Engines such expense is surprisingly small. Black Bears are built to meet the most severe requirements of the oil country, and are the result of years of engineering research and application. Careful construction and frequent tests during their manufacture are an assurance of long durability.
2. ***Cost and Accuracy of Repair Parts***
   Quantity production of engines insures reasonable costs of parts, and all parts are machined to jigs, insuring accurate fit.
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   One customer says "that Black Bears use so little gas, they run on almost their reputation alone."

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# OIL WELL SUPPLY CO.

NEW YORK—LOS ANGELES—PITTSBURGH, U.S.A.—SAN FRANCISCO—TAMPICO—LONDON

WORLD'S OLDEST AND LARGEST MANUFACTURERS OF OIL FIELD EQUIPMENT

(Continued from page 26)

**MONTANA**

| | Feb. 27 | Feb. 20 |
|---|---|---|
| Cat Creek | 3,050 | 3,050 |
| Sunburst | 15,200 | 11,650 |
| Total Montana | 18,250 | 14,700 |
| Increase | | 3,550 |

**COLORADO**

| | | |
|---|---|---|
| Moffat (Craig) | 3,450 | 3,800 |
| Fort Collins | 2,700 | 2,450 |
| Florence | 400 | 400 |
| Others | 450 | 500 |
| Total Colorado | 7,000 | 7,150 |
| Decrease | | 150 |

**NEW MEXICO**

| | | |
|---|---|---|
| Artesia | 3,300 | 3,400 |
| Hogback | 500 | 500 |
| Rattlesnake | 300 | 400 |
| Total New Mexico | 4,100 | 4,300 |
| Decrease | | 200 |
| Total Rocky Mountain | 106,350 | 99,950 |
| Increase | | 6,400 |

**CALIFORNIA**

| | | |
|---|---|---|
| Santa Fe Springs | 48,000 | 48,000 |
| Long Beach | 112,000 | 111,000 |
| Huntington Beach | 44,500 | 44,500 |
| Torrance | 28,000 | 28,000 |
| Dominguez | 23,000 | 23,000 |
| Rosecrans | 22,000 | 22,000 |
| Inglewood | 53,500 | 55,000 |
| Midway-Sunset | 92,000 | 92,000 |
| Others | 180,000 | 180,000 |
| Total California | 603,000 | 603,500 |
| Decrease | | 500 |

**EASTERN**

| | | |
|---|---|---|
| (Including Ill., Ind., Ky., Ohio, W. Va., Pa., and N. Y.) | 98,500 | 99,000 |
| Decrease | | 500 |

**Production Summary**

| | | |
|---|---|---|
| Production east of Rockies | 1,324,050 | 1,299,250 |
| Increase | | 24,800 |
| Total Production in U. S. | 1,927,050 | 1,902,750 |
| Increase | | 24,300 |

## Crude Price Changes

OIL CITY, Feb. 27.—On Feb. 27 Joseph Seep Purchasing Agency advanced Corning, O. crude 10 cents, to $2.35 per barrel. Last previous change was a 30-cent advance on Feb. 3. Other eastern crudes remained unchanged.

SHREVEPORT, March 1. — On March 1 Louisiana Oil Refg. Corp. reduced Urania, La. crude 10 cents to $1.40 per barrel.

### Buys Sterling Refiners

CHICAGO, Feb. 27.—The Cities Service Oil Co., has purchased the Sterling Refining Co., Chicago, with headquarters in the Wrigley Building. Sterling Refining Co. is one of the largest distributors of domestic fuel oil in the city. The deal involved the transfer of 200,000 gallons of bulk storage and a fleet of 15 tank trucks. The consideration is not known. Existing personnel of Sterling Refining Co. will continue to function as before.

BIRMINGHAM, ALA.—On Feb. 1 the Alabama Oil Brokerage Co., Inc., with offices here, was organized to do a wholesale and brokerage business in gasoline, kerosene, motor oil and other petroleum products. Officers are : J. A. Brown, president; C. E. Houlditch, vice president, and G. F. Markham, general manager.

# Method of Determining Allowable Depletion for 1925 Returns

By W. B. Case,
Valuation Engineer and Tax Consultant, Tulsa, Okla.

EVERY oil producer and royalty owner in the country has probably been watching, with more than ordinary interest, the daily newspaper reports in regard to the Revenue Act of 1925 which the present Session of Congress has drafted and which will, before March 5, have been signed by the President. Especially have the oil producers been following, day by day, the progress of the 'Depletion provision' and now that a compromise measure has been agreed upon between the Senate and the House, all are anxious to determine, as quickly as possible, the amount of depletion to which they will be entitled for the taxable year 1925. It is with the idea in view of simplifying the problem that this is written.

The significant portions of the Bill dealing with depletion are as follows:

### Basis for Determining Gain or Loss, Depletion and Depreciation

"Sec. 204. (a) The basis for determining gain or loss from the sale or other disposition of property acquired after February 28, 1913, shall be the cost of such property: except that—(here follow eleven exceptions dealing with property acquired by gift, transfer in trust, bequest, exchange, through reorganization (in the case of corporations) etc., which features rarely apply to oil producers and are consequently not reprinted here.)

"(b) The basis for determining the gain or loss from the sale of property acquired before March 1, 1913, shall be (A) the cost of such property (or, in the case of such property as is described in paragraph (1), (4), or (5), of sub-division (a), the basis as therein provided), or (B) the fair market value of such property as of March 1, 1913, whichever is greater. * * * * *

"(c) The basis upon which depletion, wear and tear and obsolescence are to be allowed in respect of any property shall be the same as is provided in subdivision (a) or (b) for determining gain or loss upon the sale or other disposition of such property, except that——

"(1) In the case of mines * * * *

"(2) In the case of oil and gas wells the allowance for depletion shall be 27½ percentum of the gross income from the property due during the taxable year. Such allowance shall not exceed 50 percentum of the net income of the taxpayer (computed without allowance for depletion) from the property, except that in no case shall the allowance be less than it would be if computed without reference to this paragraph."

This last clause, that in no case shall the allowance be less than it would be if it were computed without reference to this paragraph, means that in the case of properties acquired after February 28, 1913, the depletion on cost or other basis as provided in subdivision (a) shall be allowed if greater than what would be allowed under subdivision (c) paragraph (2), and that in the case of property acquired before March 1, 1913, depletion based on cost or on the fair market value at March 1, 1913, whichever is greater shall be allowed if it is greater than the depletion provided for in subdivision (c) paragraph (2).

If the unusual features provided for under subdivision (a) namely those dealing with property acquired by gift, transfer in trust, bequest, exchange, etc., are ignored, for the purpose of this discussion, and only those properties are

## Chart for Determining Allowable Depletion for 1925

**CASE 1**

*DEPLETION ON COST OR MAR.1,1913 VALUE
is greater than
27.5 OF GROSS INCOME
is greater than
50% OF NET INCOME BEFORE DEPL.
*USE DEPLETION ON COST OR 3-1-13 VALUE

**CASE 2**

*DEPLETION ON COST OR MAR.1,1913 VALUE
is greater than
50% OF NET INCOME BEFORE DEPL.
is greater than
27.5% OF GROSS INCOME
*USE DEPLETION ON COST OR 3-1-13 VALUE

**CASE 3**

27.5% OF GROSS INCOME
is greater than
50% OF NET INCOME BEFORE DEPL.
is greater than
*DEPLETION ON COST OR MAR.1,1913 VALUE
UE 50% OF NET INCOME

**CASE 4**

27.5% OF GROSS INCOME
is greater than
*DEPLETION ON COST OR MAR.1,1913 VALUE
is greater than
50% OF NET INCOME BEFORE DEPL.
*USE DEPLETION ON COST OR 3-1-13 VALUE

**CASE 5**

50% OF NET INCOME BEFORE DEPL.
is greater than
27.5% OF GROSS INCOME
is greater than
*DEPLETION ON COST OF MAR.1,1913 VALUE
USE 27.5% OF GROSS INCOME

**CASE 6**

50% OF NET INCOME BEFORE DEPL.
is greater than
*DEPLETION ON COST OR MAR.1,1913 VALUE
is greater than
27.5% OF GROSS INCOME
*USE DEPLETION ON COST OR 3-1-13 VALUE

*Whichever is greater.
In the case of property acquired (1) for stock, (2) by gift or transfer in trust prior to January 1, 1921, or (3) by bequest or inheritance, substitute thruout the chart for "Cost or Mar. 1, 1913 Value" wherever it appears, the phrase "Value at date of acquisition."

# Gasoline Gallonage Gains 19.4 Per Cent in 30 States

CLEVELAND, March 1.—In 30 states having gasoline taxes or inspection, gallons of gasoline taxed or inspected in 1925 totaled 3,521,058,185, an increase of 19.4 per cent over the quantity taxed or inspected in 1924. These 30 states had 38.3 per cent of passenger cars and trucks registered in the United States in 1925. Registrations in these states were 16.3 per cent more in 1925 than in 1924. The gallonage statistics were compiled by the American Petroleum Institute.

While tax figures represent actual consumption, inspection figures may vary from consumption because they may represent a distributor's stocks rather than his sales. This is the case in South Carolina for which inspection figures are given in the following table. In South Carolina cargo receipts of gasoline are inspected and some of this gasoline goes to neighboring states as well as to South Carolina for retail. But the figures as a whole provide a fair index to gasoline demand because volume of receipts is closely related to volume of consumption.

Gallonage figures for December, 1925, show an increase of 50,937,235 gallons over December, 1924, or 20.5 per cent. The difference between the daily average figures for November, 1925, and December, 1925, was only 384,695 gallons, or a decline of 3.8 per cent in December. Gallonage figures of the institute and automobile registration statistics follow:

| State | Gasoline Consumption November, 1925 Gallons | December, 1925 Gallons | December, 1924 Gallons | 12 Months Ended With December, 1925 Gallons | December, 1924 Gallons | % Inc. 1925 Over 1924 | Auto Registrations 1925 | 1924 | % Inc. 1925 Over 1924 |
|---|---|---|---|---|---|---|---|---|---|
| Alabama | 9,447,124 | 9,594,078 | 8,132,221 | 107,020,160 | 86,933,049 | 22.6 | 194,580 | 157,262 | 23.7 |
| Arizona | 2,555,064 | 2,789,280 | 2,252,502 | 28,531,687 | 24,361,538 | 17.5 | 68,055 | 57,828 | 17.5 |
| Arkansas | 6,885,734 | 7,497,710 | 5,190,050 | 83,541,389 | 60,417,629 | 38.2 | 184,291 | 141,983 | 29.8 |
| Colorado | 8,142,731 | 7,824,396 | 7,695,839 | 100,823,397 | 92,597,673 | 8.8 | 244,227 | 213,247 | 14.5 |
| Delaware | 1,355,054 | 1,605,340 | 1,330,668 | 17,883,700 | 16,135,546 | 10.5 | 39,840 | 35,136 | 13.4 |
| Florida | 22,959,637 | 26,276,566 | 13,777,570 | 211,931,438 | 126,035,290 | 68.1 | 288,610 | 194,196 | 48.6 |
| Georgia | 14,913,554 | 13,917,771 | 11,645,598 | 147,647,661 | 123,502,494 | 19.5 | 247,938 | 209,300 | 13.7 |
| Idaho | 2,776,042 | 2,350,474 | 1,550,686 | 32,602,227 | 27,283,614 | 19.4 | 80,744 | 69,225 | 16.6 |
| Indiana | 24,686,476 | 21,731,932 | 18,535,288 | 277,286,223 | 247,120,174 | 12.2 | 720,653 | 650,219 | 10.8 |
| Kansas | 16,032,950 | 16,283,150 | 13,703,600 | 211,728,000 | 185,535,050 | 14.6 | 457,033 | 410,891 | 8.8 |
| Kentucky | 8,653,444 | 7,422,084 | 7,564,252 | 100,049,183 | 86,607,862 | 15.5 | 258,971 | 231,784 | 11.7 |
| Louisiana | 10,133,435 | 11,158,999 | 9,321,248 | 118,567,887 | 99,748,012 | 18.8 | 205,500 | 178,000 | 15.5 |
| Maine | 4,642,059 | 2,995,395 | 2,113,169 | 58,294,119 | 52,244,403 | 11.6 | 137,344 | 127,178 | 7.9 |
| Minnesota | 20,289,000 | 17,805,450 | 13,011,496 | 245,988,750 | 213,463,185 | 15.2 | 569,694 | 502,987 | 13.2 |
| Mississippi | 7,168,154 | 8,316,228 | 6,018,996 | 83,362,874 | 61,563,240 | 35.4 | 180,266 | 134,547 | 33.9 |
| Missouri | 22,157,050 | 21,359,550 | 27,816,400 | 259,063,000 | 231,283,600 | 12.0 | 602,900 | 544,635 | 10.7 |
| Nevada | 768,265 | 698,519 | 534,599 | 9,250,625 | 8,118,397 | 13.9 | 21,300 | 18,387 | 15.8 |
| New Hampshire | 2,866,588 | 2,307,792 | 1,547,487 | 35,790,408 | 30,626,489 | 16.8 | 81,220 | 71,929 | 12.9 |
| New Mexico | 1,804,353 | 1,690,561 | 1,774,288 | 20,995,199 | 18,799,108 | 11.6 | 48,636 | 41,750 | 16.5 |
| North Dakota | 4,618,506 | 4,500,505 | 2,188,004 | 66,366,769 | 50,935,982 | 32.5 | 144,936 | 117,061 | 23.8 |
| Oklahoma | 15,717,005 | 16,302,000 | 14,436,679 | 176,233,023 | 146,360,912 | 20.4 | 455,300 | 342,982 | 32.7 |
| Oregon | 7,958,227 | 7,948,431 | 5,754,455 | 99,020,752 | 86,447,146 | 14.7 | 215,826 | 192,629 | 12.0 |
| South Carolina | 7,788,191 | 7,210,438 | 6,655,424 | 84,904,341 | 67,563,389 | 25.6 | 170,648 | 163,382 | 4.4 |
| South Dakota | 5,802,470 | 6,323,476 | 4,258,506 | 75,164,374 | 63,801,269 | 17.8 | 186,085 | 142,280 | 30.8 |
| Texas | 38,174,437 | 40,320,500 | 34,856,424 | 457,008,653 | 374,876,493 | 21.9 | 971,756 | 834,040 | 16.5 |
| Utah | 2,479,209 | 2,871,478 | 1,855,851 | 31,857,999 | 28,180,095 | 13.5 | 90,422 | 79,233 | 14.1 |
| Virginia | 11,014,467 | 11,241,348 | 9,590,969 | 122,140,943 | 110,101,975 | 10.9 | 280,700 | 261,643 | 7.2 |
| Washington | 12,949,815 | 12,725,106 | 9,993,230 | 161,652,585 | 143,090,956 | 12.9 | 328,384 | 294,812 | 11.3 |
| West Virginia | 5,413,267 | 5,627,880 | 4,482,375 | 75,601,127 | 63,540,697 | 19.1 | 212,816 | 190,134 | 11.8 |
| Wyoming | 1,534,543 | 1,121,086 | 1,292,414 | 20,799,692 | 20,546,908 | 1.2 | 48,120 | 43,639 | 10.2 |
| Total | 301,686,851 | 299,817,523 | 248,880,288 | 3,521,058,185 | 2,947,822,175 | 19.4 | 7,736,795 | 6,652,319 | 16.3 |
| Daily average | 10,056,228 | 9,671,533 | 8,028,396 | 9,620,378 | 8,054,159 | .... | ..... | ..... | .... |
| Increase over previous year: | | | | | | | | | |
| Amount | ..... | 50,937,235 | ..... | 573,236,010 | ..... | .... | ..... | ..... | .... |
| Percentage | ..... | 20.5% | ..... | 19.4% | ..... | .... | ..... | ..... | .... |
| District of Columbia | 3,837,171 | 3,735,032 | 3,162,110 | 44,698,521 | ..... | .... | 116,652 | 91,726 | 27.1 |
| Michigan | 39,132,232 | 36,165,384 | ..... | ..... | ..... | .... | 992,667 | 868,587 | 14.2 |
| Nebraska | 11,061,823 | 10,465,596 | ..... | ..... | ..... | .... | 336,500 | 308,713 | 9.0 |
| Ohio | 46,271,857 | 44,234,489 | ..... | ..... | ..... | .... | 1,287,000 | 1,244,000 | 3.4 |
| Rhode Island | 4,193,502 | 3,966,727 | ..... | ..... | ..... | .... | 101,848 | 90,652 | 12.3 |
| Wisconsin | 20,305,788 | 16,878,819 | ..... | ..... | ..... | .... | 596,414 | 525,221 | 8.4 |

considered which were acquired prior to March 1, 1913 or purchased subsequent to March 1, 1913, it will be noted that six possible cases arise, and in determining the allowable depletion for any case the accompanying chart will be found useful.

A study of the accompanying chart will show that in four of the six cases which can arise the allowable depletion is the depletion on cost or March 1, 1913 value whichever is greater. It will therefore be necessary in every case to determine the depletion on cost, or March 1, 1913 value, whichever is greater. Then for each property there should be determined (A) the gross income which will include sales of oil, gas, casinghead gas, residue gas, steam, water, in fact any income from the property incident to the operation of the property for the production of oil and or gas; (B) the net income which is the gross income less operating expenses, depreciation of equipment and taxes. There should then be placed side by side the three items: (1) 27.5% of the gross income or 27.5% of Item "A" above. (2) 50% of the net income before depletion or ½ of Item "B" above. (3) Depletion on cost or March 1, 1913 value whichever is greater. Which of these three is the allowable depletion can be determined by the use of the chart.

## Marketer Sues Sinclair For Million Dollars

Staff Special

CHICAGO, March 1.—Sinclair Refining Co. was made defendant in a million dollar damage suit here Friday when Lion Oil Co. initiated suit in the circuit court of Cook county, Illinois, alleging injury to its business reputation through statements of Sinclair salesmen. Lion Oil Co. has no connection with Lion Oil & Refining Co. of Kansas City but is compounder and local distributor of gasoline.

Sheldon Clark, vice president of Sinclair Refining Co. and local executive representative claims no knowledge of the case except what he has read in the newspapers and adds that service has not been made officially upon the company's Chicago lawyers.

Attorneys for Lion Oil are free to state the action is brought in retaliation at alleged performance of Sinclair sales representatives. C. E. Carpenter, attorney for the plaintiff, says he has affidavits from Lion's customers, owners of individual service stations in Chicago, to the effect that Sinclair salesmen and others told them in substance that Lion Oil Co. was about to fail financially. He claims this was done in an effort to get these customers to break contract with Lion and sign one with their firm.

TULSA, OKLA., Feb. 27.—E. C. Prator, formerly assistant to Ralph Moon, sales manager of the Imperial Oil Marketing Co., will become affiliated with the Kendrick Oil Co., of Tulsa, effective March 1. Mr. Prator will handle the sales and brokerage business for the Kendrick company.

# Evaporation Loss At Refineries Can Be Greatly Reduced By Good Equipment

By Ludwig Schmidt
Associate Petroleum Engineer, Bureau of Mines
*Published by Permission Director Bureau of Mines*

*Read before W. P. R. A. Meeting, Fort Worth, March 3.*

DURING the last two years much improvement has been made in refinery equipment and in methods of handling gasoline, so that today losses from the evaporation of gasoline in the average Mid-Continent refinery are probably only one-half as great as in 1923 and 1924.

During the early spring and summer months of these years the writer conducted a series of tests in several refineries and at that time estimated the average evaporation losses of gasoline, in its various stages of handling, to be as follows:

| | Per Cent |
|---|---|
| Run down tanks | 1.8 |
| Treating | 0.5 |
| Filling tank car | 0.5 |
| Storage | 2.5 |
| Miscellaneous handling | 1.0 |
| Total | 6.3 |

The one per cent "miscellaneous handling" loss is a composite estimate based on the assumption that gasoline is handled at least three times after leaving the run down tank and includes proportionate blending losses as taken from plant records. The storage loss of 2.5 per cent is based upon the assumption that on the average gasoline is held three months before shipping.

At the time these tests were made, refineries were operating at about 80 per cent of their capacity. If the refineries had been operating at full capacity, the percentage loss would have been lower, because the actual evaporating surface per barrel of gasoline would have been less. On the other hand, if the refineries had been operating at less than 80 per cent, the percentage of evaporation loss would have been greater.

In Mid-Continent plants (exclusive of cracking units) the average yield of gasoline is probably about one-third of the total crude run. A six per cent loss of gasoline is therefore equal to a two per cent loss of the crude run. At the time of these tests, the average overall loss in these plants was probably between three and four per cent of the crude run. Thus the evaporation of gasoline may account for a considerable part of the overall refinery loss.

As already stated an average reduction of 50 per cent has been made and several refineries at the present time have succeeded in reducing their losses still further. There is of course an economic limit to the reduction of these losses, nevertheless improvement is still possible.

### Reduction of Evaporation Losses in Run Down Tanks

All methods for reducing evaporation may be divided into two general classes; "floating roofs" constitute one class, while the other includes the systems which use vapor tight tanks. Vapor tight tanks will eliminate practically all losses except those caused by "breathing" (due to variation in atmospheric conditions) diffusion and by the expulsion of gasoline laden vapors when a tank is filled.

The construction of a vapor tight tank is a comparatively simple matter. However, keeping the tank tight is another question and one which is not often given sufficient attention.

### Tank Grades

Run down tanks and other refinery tanks are usually intended to be permanent and should, therefore, be placed on good foundations or "grades." There are two principal reasons for this; first, if the grade is not level when the tank is erected the rivet holes in the tank plate will not line up properly, resulting in unsatisfactory riveting. Also, the tank will be out of round making more difficult the connection of the roof plates with the top angle iron.

The second important feature is that some grades do not settle evenly. The grade will tend to settle after the tank is placed and if it settles unevenly stresses and strains will develop in the tank. These will distort the tank and leaks will develop along the seams and at the top angle. Leaks below the oil level are easily seen and repaired. Unfortunately, the larger leaks are usually around the top angle and in the roof seams. These are not easily located and therefore not repaired, with the result the tank loses its effectiveness in reducing evaporation losses. Money spent wisely on tank grades will pay dividends, for well-built and well-drained grades will not only lengthen the time that the tanks will remain vapor tight, but will also tend to prevent corrosion of the tank bottoms.

### Tank Fittings

Another method of increasing the life of a tank is to have all thief hatches, valves, and other fittings located near the edge of the tank, so that the gager or operator will not have to stand or walk on the tank roof. Several of the bolted-tank manufacturing companies advocate this arrangement for field tanks, and it can easily be adopted by refiners for their run down tanks, as overhead walks are usually provided. The weight of a man walking over a tank roof several times a day will soon break caulked joints and cause pin hole leaks to develop in roof seams.

Vapor tight tanks should be equipped with vacuum and pressure relief valves and vapor tight thief and gage hatches. If the tank is equipped with a swing line, it should enter the tank through a stuffing box. The writer has seen several tanks which were equipped with water sprays or other cooling devices, while the gage hatches consisted only of hinged lids. Even when new these lids could not be considered as vapor tight, and in use they were left open more often than not. Some instances were noted of the swing line entering the tank through the gage hatch, the free end of the swing line being wrapped around the guard rail or a rung of the ladder, thus holding the gage hatch partly open. Such practices allow air to circulate freely over the surface of the gasoline, thus increasing evaporation.

### Evaporation from Run Down Tanks

There are several factors which influence the rate of evaporation from run down tanks.

First is the temperature of the gasoline when it enters the tank. It is not unusual during the summer months to observe stream temperatures between 90° F and 100° F at the look box. Sometimes they exceed this. Since these high temperatures are not far below the initial boiling point of the gasoline the vapor pressure is high and the rate of evaporation is greatly accelerated.

Second, tail gases should be removed before the gasoline enters the tank. The vapor above the gasoline in the tank is often hotter than the vapor at the look box. If tail gases are allowed to flow through the run down lines with the gasoline, their temperature is increased. Therefore, they will carry away more gasoline vapor than if they were removed at the look box. If in addition these gases are allowed to bubble up through the gasoline they probably will carry away entrained liquid.

Third, the gasoline should not be discharged into the run down tank as a spray for this causes much gasoline to

be carried out as entrained liquid by air and gas circulation.

Fourth, the run down line should be painted a light color to lessen heat absorption. This factor is of importance in long run down lines during the hot summer months. In several instances the temperature of the gasoline entering the tank was found to be 4 or 5° higher than that of the stream at the look box.

Even with vapor tight tanks there is a considerable loss from run-down tanks due to the displacement of vapor laden air which is forced out of the tank as it is filled with gasoline. This loss is important since run down tanks are often filled and emptied several times a day. To reduce this loss some refiners connect their run down tanks with overhead vapor lines so that as one tank is being filled the displaced vapor enters a tank that is being emptied. Even with this system there is some loss, for there will be periods when the system will not be in equilibrium and vapors will be given off or air taken in. Floating roofs, breather bags, and vapor recovery systems reduce the filling losses to a greater extent than connecting the tanks in series with overhead vapor lines, for these systems prevent the discharge of vapor air mixtures to the atmosphere.

### Evaporation Losses During Treating

The largest evaporation losses in treating gasoline are found in the old type batch agitator, using an air blower for mixing the chemicals with the gasoline. Tests on this type of equipment show average evaporation losses of about 0.5 per cent.

Tests made on batch agitators equipped with circulating pumps for mixing the chemicals and gasoline show an average evaporation loss of about 0.2 per cent.

Some refineries have continuous treating plants which are entirely enclosed, so that the gasoline does not come into contact with the air; therefore there is no evaporation loss.

### Reduction of Evaporation Losses in Filling Tank Car

The average evaporation losses in filling tank cars with gasoline are high because most of the gasoline is shipped during the hottest period of the year. To reduce evaporation, some refiners load their most volatile products at night, or spray the cars with water if loading during the day. Both of these methods reduce evaporation losses, but it is not practicable to do all the loading at night, and it is doubtful whether a water spray is always economical.

Many factors affect the rate of evaporation during the loading of a car. Besides the character of the gasoline and the atmospheric conditions, one must consider the temperature, also the rate and method of filling the car. Formerly it was the practice to have the loading line extend only a few inches into the dome and allow the gasoline to splash into the car. This is a very wasteful practice, for it allows the air in the car to become rapidly saturated with gasoline vapor, and permits air currents to carry away the saturated air and entrained liquid.

Most refiners now use a sleeve which is attached to the loading line and extends from the dome to the bottom of the car. This reduces the loading loss considerably, as splashing is eliminated and air currents do not make such intimate contact with the gasoline. However, it is doubtful if this practice alone reduces the evaporation losses to the economic limit. Tests made to determine the evaporation losses with this type of equipment show a loss of 0.5 per cent.

### Reduction of Evaporation Losses from Gasoline in Storage

The average evaporation loss of gasoline in storage has been estimated to be 2.5 per cent. The use of vapor tight tanks for reducing this loss is very common; consequently the suggestions pertaining to tank grades and to the location of gage hatches and other tank fittings apply to large storage tanks even more than to run down tanks. There are some other factors to be considered, however, which though applicable to all classes of tanks, are of especial application to storage tanks.

### Roof Design

The first of these is the design of the roof itself. Formerly it was the practice to design a tank roof with a high cone or dome, thus allowing a large vapor space above the surface of the liquid, even when the tank was full. As the volume of the vapor expelled from the tank when breathing is dependent upon the volume of the vapor space (other conditions being equal), the smaller the vapor space the less of the vapor and air mixture will be expelled.

The second factor is closely allied to the first. Tanks for storage should be built for average working conditions. In other words, if for a certain product 5000 barrels storage is ample most of the year it is a mistake to build one 10,000 barrel tank to allow for excess storage for a short period. It is better to have two 5000 barrel tanks. In a 10,000 barrel tank, half full, there are stored about two and one-half barrels of gasoline per square foot of evaporating surface, while in a full 5000 barrel tank there are about five barrels per square foot. In addition it must be remembered that the lower the level of the liquid in the the tank the greater the volume of vapor space.

Another factor is the connection of the roof plates with the top angle. It is not considered the best practice to have the top angle inside of the top ring, for by this means the seams may be caulked after all rivets are driven. The roof plates are also of sufficient thickness to insure a good caulking edge. With "all-welded" roofs these features do not have to be considered.

## TANK FITTINGS

### Swing Line Hatches

On the old type storage tanks the swing-line hatches were situated upon the roof and consisted of an iron box containing the winch and covered with a hinged lid which was never vapor tight. The best practice is to have the swing line enter the tank through a stuffing box. The winch may be placed on the tank roof; the customary practice, however, is to place the winch on the bottom ring of the tank so that it can be operated from the ground.

### Thief and Gage Hatches

Thief and gage hatches formerly used consisted of holes cut in the roof and covered with tin caps. No attempt was made to make them vapor tight. Now it is customary to install self closing thief hatches although many companies use a flange and plug. This gives satisfactory service, especially on tanks that are gaged only once or twice a month.

There are now on the market several gaging devices to determine the liquid content of a tank that eliminate the customary gaging with a steel tape. These devices are gaining favor on pressure tanks containing very volatile gasoline or tanks requiring frequent gaging. The use of such devices saves time besides eliminating the necessity of opening the gage hatch on the tank.

There are two principal types of these gaging devices. One consists of a float that rides on top of the oil and is attached to a cable. The other end of the cable is attached to a metering device on the outside of the tank. The second type of gaging device is based upon the pressure exerted by the column of oil upon an air chamber in the bottom of the tank. The pressure is transmitted to a mercury column graduated in feet and inches or in barrels.

### Vent Lines

Formerly storage tanks were equipped with four-inch vent lines, the number of vents depending upon the size of the tank and on its use. Often these vents consisted of short pipes on top of the roof; however, to comply with insurance regulations they usually were carried outside of the fire dyke and equipped with fire screens. From the standpoint of preventing evaporation this type of vent is not satisfactory; first, when a tank is equipped with two or more vent lines on opposite sides of the tank there will often be a flow of air into one vent and out of the other due to differential wind pressure. Second, this type of vent line is liable to become clogged so that it does not function properly. Instances have in fact been reported where the roof was pulled in on emptying the tank. Many companies are now installing a single vent line of large capacity. This slopes down from the roof at an angle and there are no sharp turns or bends that may become clogged.

### Vacuum and Pressure Relief Valves

With vapor tight tanks much care has to be used in the selection of vacuum and pressure relief valves on vent lines. These must be of sufficient capacity to take care of the excess pressure or vacuum under the severest conditions.

Two of the principal factors that determine the volume of air-vapor mixture that must be moved into or out of

the tank are: first, rate of filling or emptying a tank, each barrel of oil displacing 5.6 cubic feet of vapor. Second, the maximum temperature change per hour when the tank is nearly empty. Rapid temperature changes are usually caused by a sudden rain or thunder storm on a hot day, which results in a rapid lowering of the temperature. This causes a flow of air into the tank.

The writer has noted several instances of a drop of 35 or 40° F in the temperature of the vapor space within an hour. Relief valves must be ample to take care of both these factors at the same time—that is, rapid emptying of the tank plus a sudden change in the temperature. It is advisable to obtain data from the valve manufacturer showing the capacity of the valves, for valves of the same size but of different manufacture because of differences in construction, may not have the same capacity. A 33 day evaporation test was made to compare two 66,000 barrel gasoline storage tanks. One tank was equipped with a free vent line and during the test lost about 120 barrels; the other was equipped with a vacuum and pressure valve and lost about 95 barrels. Vacuum and pressure relief valves eliminate diffusion and reduce breathing by eliminating the movements of vapors into and out of the tank due to minor atmospheric changes.

### Cooling System

Water cooling systems, such as water sprays and water seal roofs are used by many refiners. The successful use of a water spray depends upon a cheap supply of water and though a large amount of water is required they have a maximum cooling effect. The sides or shell of the tank is also cooled by a water spray. In order to obtain the maximum effectiveness, water sprays should be so placed that wind and air currents will not carry the water from the tank roof, thus wetting one part of the roof only. One refiner has successfully solved the problem of wind or air currents by completely covering run down tanks with burlap on a wood frame. The burlap acted as a wick, thus distributing the water over the entire tank. A water spray on a tank that is not vapor tight is usually a waste of money.

Water seal roofs by nature of their construction insure vapor tightness, also as compared with umbrella and cone roofs they reduce vapor space to a minimum. The temperature of the vapor within the tank, however, cannot be less than the actual temperature of the water circulated over the roof.

Insulation for tanks is generally a permanent fixture. The initial cost may be rather high but the operating cost is negligible. If the tanks are completely insulated without an air space, gasoline to be stored in them should be pumped in at the lowest temperature practicable.

It is believed that types of insulation with an air space between the insulation and the tank, or insulating the roof only, are in general more satisfactory, for gasoline may be cooled in such a tank even though it be pumped in at a relatively high temperature.

Through the courtesy of one of the larger refining companies the writer was given the results of an evaporation test made on gasoline storage tanks equipped with two types of insulation. The tanks were of all steel construction, 90 feet in diameter, by 30 feet high and painted grey. Observations were taken for a period of about 268 days, on four tanks. One with an old type uncaulked roof showed a loss of 4.84 per cent; another with a caulked roof, 3.36 per cent; the third with an insulated roof, 2.22 per cent. The fourth was an all steel tank protected with an insulated tank house, or hood, painted black. It showed a loss of 1.92 per cent.

### Vapor Recovery Systems

Some refiners equipped to recover gasoline from uncondensed still vapors also recover vapor given off from their storage and run down tanks.

The recovery plants are either of the compression or absorption type; many of the smaller ones are modifications of the absorption type. In them the vapors are passed through absorption towers containing naphtha which extracts the gasoline. The gasoline extracted from the vapor enriches the naphtha so that it may be sold as a gasoline blend.

These recovery systems apparently give good results; however, care should be taken to prevent the "remaking" of the product. Usually each tank in a vapor recovery system is equipped with vacuum and pressure relief valves; if vacuum is held on the tank there is likely to be a flow of air through the vacuum relief valve to the gathering line. This accelerates evaporation and though the gasoline evaporated is recovered it is a "remaking" of the finished product. In order to eliminate this problem the system should be so constructed that the vapor from the tanks be discharged into the gathering system under a slight pressure. In all recovery systems the writer has investigated the tail gases were included so that it has been impossible to obtain definite data regarding the efficiency of the system. Through the courtesy of one refiner, the writer was allowed to see plant records which showed an overall refining loss of less than one per cent.

Breather bags are a modified form of vapor recovery. In an article on this system, it was shown that evaporation losses from gasoline storage tanks were reduced from .25 to .04 per cent per month throughout the storage period.

"Floating roofs" have been in use for some time in refinery tanks. A floating roof rides or floats upon the surface of the liquid in the tank, thus eliminating practically all vapor space. The writer has made tests comparing tanks equipped with floating roofs and tanks equipped with canopy roofs. Gasoline with a gravity of 62° A. P. I. was used in these tests. The results showed that for a canopy roofed tank the filling loss was .17 per cent, while a tank equipped with a floating roof had a loss of .04 per cent. Since these tests many mechanical improvements have been made in floating roofs.

It is not possible in a paper of this length to go into the details of the various tests that have been made of systems used to decrease evaporation losses. It is possible to save at least 50 per cent of the ordinary evaporation loss by means of vapor tight tanks properly equipped and between 80 and 90 per cent with the more expensive and elaborate systems. Irrespective of the system adopted the results obtained will depend to a large extent upon the care given the equipment and on careful operation. In other words, the most inexpensive systems properly cared for may give better results than a more expensive equipment which is allowed to shift for itself.

Wilson, Atwell, Brown and Chenwick, A new method for the prevention of evaporation losses from gasoline storage. Industrial and Chemical Engineering. October, 1924.

## Illinois Jobbers Provide For Field Secretary

CHICAGO, March 1.—Illinois Petroleum Marketers Association held a lively meeting in the assembly room of the Chamber of Commerce in Bloomington on Feb. 25. Standard Oil Co.'s quantity discount agreement came in for a round denunciation by the jobbers as a source of grief and loss to the Independents, not so much as carried out by the Standard but by various other organizations each in its own way.

Charles S. Rosenthal of Chicago, president of the state association, was vigorous in his opposition to Q. D. A. and especially to farmers through agricultural groups as practiced by some competitors in this state. J. L. Murray, head of the marketing division of National Petroleum Marketers Association, Chicago, talked for about 30 minutes and among other things elaborated upon the uneconomic principle of discounting material sold to farmers who for years have enjoyed a 2-cent discount on gasoline in spite of the fact that delivery to them is the most costly of all jobbers' sales.

The organization voted authority at this meeting to employ a field secretary and the new officer will be chosen and put to work in the course of a few weeks.

### Flood Impedes Refineries

CLEVELAND, March 2.—Operations of refineries at Franklin, Pa., are hampered by the flood in the Allegheny which has partly inundated several pipe line pumping stations. Refineries are unable to get crude and are able to run on only the small supplies they held at the plants. The flood extends to Oil City but plants there are still able to operate at their normal rate. The Franklin Quality Oil Co. at Franklin lost two small tanks of gasoline.

# The Traffic Department and Its Place In the Oil Industry

By H. C. Mulroy
Vice President, Marland Refining Co.
*Read before W. P. R. A. Meeting, Fort Worth, March 3.*

TRAFFIC work is thought by some to be something apart from transportation, having only to do with rates, but it should be understood to be inclusive. Transportation—rail, water and pipe line—plays an important part in every phase of the oil industry.

A traffic department is an essential part of the organization and to function properly its importance should be understood and appreciated by other departments of the company, and it should receive full co-operation.

The traffic expert today must have more than an understanding of the rudiments of transportation and be able to quote a few rates. He must have an understanding of the economics of transportation, be thoroughly familiar with interstate commerce laws, the laws of common carriers, Interstate Commerce Commission, and various state commissions' rules and regulations, Bureau of Explosives rules, tariff rules and regulations, also operating and accounting rules and regulations of the carriers.

Traffic work in the oil industry includes the operation and maintenance of tank cars. Some idea of the growth and importance of this part of the work may be gained when it is considered that in 1889 when we produced 35,000,000 barrels of crude, records show that on October 1, of that year there were 1432 tank cars in use, owned almost entirely by the railroads. In 1914, there were 30,039 tank cars in use—in 1918, 55,080, and in 1925, when we produced 755,852,000 barrels of crude, the number of tank cars in use has risen to over 140,000 of which about 15,000 are owned by railroads.

### $250,000,000 In Tank Cars

Privately owned tank cars, the greater part of which are in the petroleum service, represent an investment of approximately $250,000,000. It might be interesting to glance at your investment account and note your tank car investment as compared with your refinery investment and ask yourself if you have a well equipped and efficient traffic department to get full efficiency from tank car operations as you look for and expect to get from your refinery organization for refinery investment and operations.

If the average tank car travels only about 10,000 miles per year this would mean on the basis of 140,000 cars in service, a total mileage of 1,400,000,000 miles per year.

Tank cars earn 1½ cents per mile from the carriers for both loaded and empty moves. Out of these earnings must be paid interest on investment, maintenance, taxes, insurance and depreciation. At the best you will find a red figure, but to keep that red figure as low as possible you must have efficient operation, to secure which you must have a traffic organization that will keep the cars moving, keep mileage records, check mileage payments, keep car repair records, check car repair bills and keep loaded and empty mileage equalized on each railroad.

For this latter purpose, it is necessary for your traffic department to have full control over routing the cars in your service. If excess empty mileage on each railroad is not offset with loaded mileage within six months following the close of the accounting period, such excess empty mileage must be paid for at tariff rates applying on the movement of new equipment, plus a refund of the mileage earnings previously allowed by the carriers. You will readily understand that a failure in this direction would result in a very heavy expense to the tank car owner.

### Car Records Important

It is important that complete car records be kept for another reason, and that is to have a definite check on the movement and know the location of the cars to insure a supply, and be in position to take care of any emergency requirement.

American Railway Association rules provide for certain items of repair to be assumed by the tank car owners, known as "owners' defects," and other items to be assumed by the carrier, and what might be owners' defects under one set of facts become carriers' liability under other conditions. You will readily appreciate, therefore, the importance of having a proper check on all car repair bills to see that the charges made by the carriers are proper under the rules.

It quite frequently happens that erroneous charges are made because of erroneous car records of the carriers and if the traffic department does not have a complete car record of its own to use as a basis for checking the bills such erroneous charges would be paid, resulting in a loss to the car owner.

Efficient and prompt transportation is very essential in the oil industry. Delays in the movement of materials and supplies are expensive, especially in field operations. Intelligent routing of shipments, especially in times of traffic congestions, to avoid embargoed routes, and intelligent tracing are productive of results, the value of which cannot be measured in dollars and cents. Carriers welcome co-operation along these lines and it is desirable in order to accomplish the purpose, that tracing should be done intelligently.

The cost of transportation plays a very important part in the operations of the industry. A traffic organization must be familiar with the fundamentals of all competitive kinds of transportation in order to secure for the industry the proper rail rates, on the inbound material and supplies and out-bound products. It should be the function of the traffic department to secure adjustments in rates in line with rates to comparable destinations and under competitive conditions. This does not mean the attempting to secure arbitrary reductions in rates but rather adjustments where rates may be out of line considering all conditions, particularly in connection with the opening up of new fields.

It is very important that all freight bills should be audited by a competent traffic man to find any overcharges, as quite frequently errors are made by the carriers in assessing the charges, either in classification, weight or rate applicable, and while it is the duty of the carriers under the law to audit these freight bills in their freight auditing departments and make refunds of such overcharges, yet it is desirable to audit your own freight bills, as quite frequently tariffs are subject to different interpretations and by so handling you are enabled to secure the application of the lowest rate that can be applied under such tariff.

It is important and an absolute necessity in the marketing of the products to have complete rate information from a competitive standpoint. An intelligent presentation to the marketing department of the rate situation from competitive points to certain territories may give the marketing department a different picture and lead them to a change in their efforts to market in certain territories.

It is also important that proposed rate adjustments be brought to the attention of the marketing department to see what effect they might have on sales policies. Sales orders should pass through the traffic department to have the rate and routing shown thereon so that this information may be properly shown on the bills of lading.

### Rules Governing Location

Serious consideration should be given in the location of loading racks, plants, etc., to the traffic features involved and one who understands these matters should be in conference before definite conclusions are reached, as otherwise, serious difficulties from a rate and transportation standpoint may be encountered in the operation of the facility. Certain rules of the

Bureau of Explosives must be complied with in making such locations.

The agencies for the transportation of petroleum are more varied than for any other commodity. Rail traffic for petroleum is very large. In 1924, 8,411,660 net tons of crude oil and 41,297,561 net tons of refined products were moved by rail. At 37 tons to the car for crude and 26.4 for refined products this is equal to a total of 1,791,643 car loads. Assuming that there are 110,000 tank cars in petroleum service, which is a conservative estimate, this would mean an average of 16.3 loads for each car per year.

Statistics show that in number of car loads originating on Class 1 steam railways during 1924, bituminous coal is in first rank; clay, gravel, sand and stone second rank; lumber, timber, etc., third rank; and petroleum and its products in fourth rank. Complete figures for 1925 are not available but the first three quarters show an increase for petroleum and its products and places these shipments in third rank, ahead of lumber, timber etc.

Statistics also show that the oil loading in 1924 was larger in car loads than the grain loading.

There has been a large increase in transportation of petroleum by water, particularly through the Panama Canal to the east coast. Barging of oil on the navigable rivers is also on the increase and plays an important part in handling oil traffic.

A survey of petroleum refineries made by the United States Bureau of Mines shows a total of 509 refineries in the U. S. on Jan. 1, 1926. Of these, 332, with a capacity for treating 2,560,000 barrels daily, were being operated. The operation of these plants creates a large amount of inbound traffic of miscellaneous materia and supplies which with the out-boun movement of manufactured products in volves movement via all agencies of trans portation. It is important for the indi vidual oil company to make a study o the traffic situation as affects his particu lar manufacturing and marketing problem taking into consideration these variou agencies of transportation. No on company can figure on its traffic prob lems being taken care of as a genera result from the efforts of another com pany's traffic organization or some traffi association, as each company's traffi problems may present a different situa tion, but much good can be accomplishe through general conferences and traffi meetings, as many traffic problems ar in common. Such meetings also have a educational value.

# Doheny Companies Seek Review Of Elk Hills Decision

Staff Special

WASHINGTON, March 1

APPEAL to the Supreme Court of the United States for a statement of the law on the subject of the leases of the naval reserves has been taken by the Pan-American Petroleum & Transport and the Pan-American Petroleum Co. Those Doheny companies have asked the highest tribunal to review the judgment of the United States Circuit Court of Appeals at San Francisco which held against the Doheny companies on practically every point of law made by them, even to the extent of declaring the government was not bound to return to them any of the $1,000,000 spent in drilling the Elk Hills reserve or the $10,000,000 spent in creating storage capacity at Pearl Harbor, but that the Pan-American companies were bound to account to the government for the oil taken by them from the reserve.

Attorneys for the Pan-American companies, in their petition to the court said there were two major questions of great importance in the case. Their first proposition was that the decision of the court at San Francisco, which went much farther than the district court at Los Angeles, was a distinct violation of a rule that "he who seeks equity must also do equity." They questioned the right of the United States to maintain a suit in equity for the cancellation of the lease without offering to reimburse the Doheny companies for the work they had done in California and Hawaii.

The second question tendered by them was as to what the act of June 4, 1920, the one under which the contract to build the storage tanks at Pearl Harbor and the lease to drill the Elk Hills reserve were made by the secretary of the navy meant, if the words that seem to authorize him to do anything and everything with the reserves, including the providing of storage, except to refine the oil that may be produced.

The Pan-American lawyers suggest that if the secretary of the navy had not the authority to make the lease nor the authority to contract for the construction of storage tanks at Hawaii, then the whole policy of conservation of oil for the use of the navy, is without foundation in law, and the secretary of the navy cannot lawfully do anything other than drill for instant use of the supposed reserves which, under the Denby plan were to be drilled so they would not be depleted by the Standard (California) and Pacific Oil Companies, owners of the adjoining property.

In support of their plea for a review of the matter, the Doheny lawyers set forth the fact that there is a conflict between the federal district court in Wyoming which passed upon the Teapot Dome case and the California federal courts, although the leases were made under the same statute, namely, the act of June 4, 1920. They also advised the court that there was radical disagreement between the district court at Los Angeles and the circuit court of appeals at San Francisco as well as the disagreement between the California courts and the Wyoming court. They also advise the highest tribunal that the government's appeal from the adverse decision in Wyoming will be considered by the circuit court of appeals at St. Paul, in May, and suggest that it should take jurisdiction of the matter now.

In their brief in support of the appeal application the Doheny lawyers said that under the judgment of the circuit court at San Francisco, the government would be doubly enriched, first by retaining the $11,000,000 spent by the Pan-American companies and second by their being obliged to pay the government for the oil they took in exchange for the $11,000,000 worth of work, materials and supplies. Affirmation of the judgment of the San Francisco Court they said, would turn an equity court into a tribunal for the imposition of excessive penalties and forfeitures.

### Pure Enlarges Muskogee Plant

Staff Special

TULSA, Feb. 27.—The Pure Oil Co. is engaged in an expansion program at its Muskogee refinery which will increase its capacity from 2,000 to 5,000 barrels of crude per day. Two Cross cracking units are being erected which will make the refinery complete as a lubricating oil and cracking plant.

Two new stills are being installed and the present battery will be charged over to the continuous system instead of batch. A continuous treating system and two new agitators will be installed as well as a new 55,000 barrel crude storage tank and a number of tanks for other storage.

The lubricating oil plant will be completed with the addition of Sharples centrifuges for the dewaxing of bright stock.

### Buys Six Gasoline Plants

LOS ANGELES, Feb. 26.—California Petroleum Corp. has bought for $5,000,000 six natural gasoline plants in the Los Angeles basin and other properties of the California Gasoline Corp. The six plants have an output of 100,000 gallons a day, it is said. This acquisition brings California Petroleum's natural gasoline output to 140,000 gallons daly.

# Taxation and the Oil Industry

By Albert D. Brokaw
Geologist and Petroleum Engineer, New York

*The accompanying is the greater part of a paper presented by the author to the petroleum division, A. I. M. E., at the annual meeting in New York, Feb. 15, 16, 17. Mr. Brokaw is a member of the firm Brokaw, Dixon, Garner and McKee, of New York, consultants in geological and petroleum engineering work, appraisals and tax matters. The paper is a summary survey of the tax situation with respect to the oil industry and its present trend, which, insofar as specific taxes on the mining industry is concerned is in the direction of nationalization, the author believes.—Editor.*

WE cannot hope in brief space to canvas all the effects of taxes upon the oil industry—in fact, it is probably impossible to determine in more than a broadly general way what the effects upon the industry as a whole really are.

It has often been pointed out that certain railroads and other public utilities pay more in taxes than they pay in dividends. I feel sure many oil companies can point to a comparable situation. Whether it is true of the industry as a whole, I cannot be sure, but I strongly suspect that the total of all taxes borne by the industry is a figure of the same order or magnitude as its distribution of dividends.

However, since all industries must bear the burdens imposed by the various taxing bodies under whose jurisdiction they may chance to come, I shall for the most part confine this discussion to taxes that are more or less specifically taxes on the oil industry and similar industries and shall have little to say about taxes that are applied equally on all corporations and individuals conducting business or owning property.

During the war, and in the years immediately following, federal taxes commanded our attention. Rates were almost beyond imagination, the laws were complicated and it was difficult to supply much of the information required in the notorious Form L and some of its alphabetical successors. Moreover, regulations were being modified, changes were retroactive and often involved the preparation of revised schedules; congress was tinkering with the law and all told there was plenty to occupy attention.

### Local Taxation Burdensome

And while our attention was fixed on the matter of Federal taxes, state and local taxing bodies had not been idle. As a result, I believe firmly that the burdens of state and local taxation in general, and to the oil industry in particular are much heavier than the burden of federal taxes. Federal tax laws since 1918 have recognized some of the difficulties besetting the oil and mining industry by making provisions which are intended to equalize matters and bring them on a par with industries less subject to violent fluctuations; the state and local taxing bodies meanwhile, appear to have singled them out for special attack. The taxes levied specifically against a group of industries usually take the form of the so-called severance taxes, though they may be designated gross receipts taxes, or occupational taxes or production taxes or what you will. They are simply taxes levied on the output, usually a percentage of gross market value, but in a few cases are imposed at a flat rate per unit of output and in others at a percentage of the net value per unit, net value in this case meeting gross value less certain specified deductions, but not the real net value to the producer.

In Oklahoma the production tax is in lieu of other taxes against the property, but in most of the states in which it is imposed, the tax is in addition to advalorem taxes, and the result is of course discriminatory. In the ninth biennial report of the Minnesota tax commission (1924) the issue is frankly stated: "There has been a growing tendency in recent years toward special taxation of natural resources, due in part no doubt to a widely prevailing opinion that the state should exact a relatively greater tribute from natural than from created wealth. In most cases the special exaction takes the form of super tax, that is, it is in addition to advalorem taxes." It might be noted that in Minnesota the law prescribes that iron mines shall be assessed for advalorem taxes at 50 per cent of their actual value, while other forms of property are to be assessed at from 25 to 40 per cent of their true value.

### What is Natural Wealth?

"Space does not permit digression at this point for discussion of the distinction between natural and created wealth. I think everyone who has ever drilled a successful wild cat well would maintain that the wealth arising from it was not entirely natural wealth but that he had some part in creating it. My own opinion is that no sharp distinction may be drawn between natural and created wealth, especially where the wealth in question arises from the production of commodities, be it oil or wool, coal or cotton.

In the 13th annual report of the tax commission of Texas, it is argued that such taxes are not double taxation because "One taxes property accumulated under the law; the other the privilege of taking our economic wealth." and the latter "The privilege of drawing upon the state's economic wealth is measured by the value and volume of the severed mineral." This ignores the fact that the state has in most cases divorced itself of the economic wealth for a stated consideration and is reasserting by legislative enactment an ownership of which it had previously voluntarily divested itself.

A more real basis for the tax however is disclosed in another paragraph: "In every instance, and before the tax is imposed the severed taxable is known to be earning income on the value assessed and hence comes within the class of subjects having ability to pay." Doubtless each one of you can cite more than one good example of an oil property subjected to such tax that is not earning income on the gross value of the oil produced, although you may be hoping for a future day when it shall.

### Get the Easy Ones First

Of course as a matter of practical politics taxes are assessed where money is available, and where a simple method of measurement may be applied, making collection easy and inexpensive, and should such tax fall to a very large extent on non-residents, or a very large part of the tax on a comparatively small number of voters—so much the better.

Among the states collecting specific taxes based on gross production of minerals are the following:

Alabama 3c per ton on iron ore.

Arkansas 2½ per cent of gross value of minerals, ore and certain other natural products.

Louisiana 2 per cent of gross value of timber, turpentine, other forest products, sulphur, salt, stone, gravel, sand and other natural deposits and; 3 per cent on petroleum and natural gas.

Minnesota 6 per cent on iron ores.

Montana 5c per ton coal 2 per cent on petroleum.

Oklahoma 3 per cent on oil and gas.

Pennsylvania 1½ per cent on anthracite.

Texas 2 per cent on oil and sulphur.

West Virginia, occupational tax, (oil and gas producers among others).

Then there is the gasoline tax. I do not care to enter into the question of whether this tax is borne by the oil industry. Certainly insofar as sales are limited by price, its effect is felt by the industry, because the tax is added to the selling price.

So far as I can learn, this tax is always levied in cents per gallon, and does not fluctuate with the price of gasoline. It ranges from 1c to 5c per gallon but probably averages between 2c and 3c in the aggregate. It is highest in the more backward states, South Carolina exacting 5c per gallon and Ar-

kansas, North Carolina and Nevada 4c per gallon. Judged on this basis alone, New York, New Jersey, Massachussetts and Illinois are the most enlightened states in the Union as they alone assess no tax on gasoline. The other 44 states, and the District of Columbia all tax gasoline.

**Tax Money Diverted**

What does it amount to? In 1924, $79,734,000 of which only 61 per cent was spent on road work, which was originally the basis for the tax. The balance of more than $32,000,000 was diverted to other uses. During 1925 some states increased the gasoline tax. In 1926 additional states may be added to the list.

This does not complete the list of specific taxes borne by the oil industry, as distinct from other industries. Many, in the nature of inspection fees and the like, are recognized as just and unavoidable. But it does appear that the mineral industries in general and oil in particular have been singled out and subjected to discrimination.

What is to be done about it? Perhaps it is too late to do anything, but it must be seen that it is not sufficient for each branch of the mineral industry to watch only such tax legislation as apparently applies to itself. I think very few oil men watched the progress of the iron miners in their fight against the "occupation tax" placed upon the industry, but court decisions affecting iron mines are sure to be brought into contests initiated by the other mineral industries. Because of the very general similarity of their enterprises it is important that matters of legislation and especially of discriminatory taxation affecting any one of them should be brought to the attention of all of these industries, in order that each may be vigilant in its defense against similar discrimination. It does not require highly developed imagination to see in the specific taxes upon mineral industries a tendency toward nationalization—if carried to extremes nationalization or rather state control tantamount to ownership is accomplished.

**Investigation Delays Work**

Turning to federal taxes, there seems to have been some progress in clearing up back returns, but efforts in this direction on the part of the income tax unit, were more than a little retarded by the senate investigation, which has had an appreciable effect on the morale of the unit, and may possibly result, temporarily at least, in throwing more cases into the board of tax appeals. The committee report has made interesting copy for the newspapers, but its effects on legislation have apparently been secondary. The minority report, while less spectacular as newspaper copy, is commended to your attention.

mention. The first of these removes the requirement that proper adjustment be made for depletion and depreciation in arriving at profit or loss from sale under the 1918 and 1921 acts and the second restrains the department from distraint of property after the statute of limitations has run even though the assessment may have been made before the time limit.

As to the new revenue act, now in conference to iron out differences between the House and the Senate, it appears in general to be a very substantial improvement over the 1924 act. Perhaps, after all, that is saying little enough.

As had been anticipated, the matter of discovery depletion was subjected to considerable overhauling. The house undertook to circumscribe and restrict somewhat the conditions under which discovery valuation is to be allowable after January 1, 1925 and incorporated in the bill much that had previously been comprehended in the regulations, without great changes.

As before, the discovery depletion allowance is limited to one-half of the net income from the lease.

**Senate Makes Change**

The senate, however, did not follow the lead of the house and broke away from previous methods of calculating depletion.

No statement of what constitutes a discovery subject to valuation is contained in the text, which says: "In the case of oil and gas wells the allowance for depletion shall be 25 per centum of the gross income from the property during the taxable year. Such allowance shall not exceed 50 per centum of the net income of the taxpayer (computed without allowance for depletion) from the property, except that in no case shall the depletion allowance be less than it would be if computed without reference to this paragraph."

On the floor of the senate the rate was changed to 30 per cent but otherwise passed intact. (Since this was written, it has again been changed to 27.5 per cent, but is not yet a law.—Editor). This plan was first suggested when the 1918 act was being framed and the discovery depletion was suggested. Congress selected the latter, possibly, because it seemed more definitely to bear a direct relation to the importance of the discovery than did the flat rate.

The matter was suggested again in the interest of simplification when the 1924 act was in preparation but was lost in the somewhat disorganized scramble that attended the preparation of that law.

There can be no question that this will tend to simplify matters to some extent, but in all probability it will result in somewhat smaller deductions than were allowable under previous acts. Discovery depletion has attracted increasing attention of men outside of the mineral industries and was subjected to heavy broadsides in the senate investigation. As a result some reduction was almost inevitable. Either of the provisions made for discovery depletion will, to a certain extent, afford relief to the successful wildcatter and this, with the general reduction in tax rates may keep his taxes within reason so far as individuals are concerned.

The substitution of a one per cent increase in corporation income tax for the capital stock tax means an increase only where a company is earning more than ten per cent on the value of its capital stock as determined by the income tax unit. Oil producing companies are commonly capitalized at a comparatively high rate of return, and they may conceivably suffer from the change. Whether the total burden on the industry will be increased or decreased is uncertain, but the change will result in considerable relief during periods when operations are unprofitable or when profits are small.

The change will mean a simplification in that corporations will be relieved of filing the capital stock tax return, and it will allow the department to eliminate the section of the income tax unit now engaged in handling capital stock tax returns as soon as cases accumulated under previous acts have been closed.

## Safety Meetings for Kansas Foremen

TULSA, Feb. 26.—Foremen's safety meetings at the center of activities in the various branches of the industry in each of the five states of the Mid-Continent field are being planned by the petroleum safety council of the Mid-Continent Oil & Gas Association, with headquarters here.

These meetings will be held in order that foremen can discuss problems generally, compare notes and secure ideas from the others.

The program is being started in Kansas and meetings will be held during the week of March 1. Committeemen and towns in which meetings will be held are:

March 1, Arkansas City, chairman, R. C. Roberts, Roxana Petroleum Co., Arkansas City; H. A. Shaw, Gypsy Oil Co., A. R. Peters, Marland Refining Co., and C. A. Delcamp, Waite Phillips Co., all of Winfield.

March 2, Eldorado, chairman, Harry Miller, Skelly Oil Co., Eldorado; V. R. Oakley, Waite Phillips Co., Wichita; C. L. Henderson, Vickers Petroleum Co., Potwin; Weston Payne, Empire Companies, Oil Hill; F. P. Graham, Carter Oil Co., Al Becker, Phillips Petroleum Co., and Ben Mouser, Sinclair Oil & Gas Co., all of Eldorado.

March 3, Madison, chairman, H. W. Hanes, Skelly Oil Co., Madison; J. A. Birtciel, Tidal Oil Co., and J. P. Wolf, Empire Companies, both of Madison, and H. M. George, Mid-Continent Petroleum Corp., Virgil.

March 4, Eureka, chairman, T. E. Elder, Prairie Pipe Line Co., and H. R. Cornett, Skelly Oil Co., both of Eureka.

March 5, Independence, chairman, John Smith, Prairie Oil & Gas Co., Independence; J. M. Steffen, Standard Oil Co. of Kansas, Neodesha; Bert Healy, Sinclair Refining Co., Coffeyville; Paul Johnson, Southwesteren Gas Co., and M. J. Loftus, Prairie Pipe Line Co., both of Independence.

March 6, Sedan, chairman, Fred Chubb, Denman Bros., anl E. T. Robinson, National Supply Co., both of Sedan.

# INSURANCE RATE CUT OFFERED IF WATER PRESSURE IS RAISED

## Underwriters Propose 5 Per Cent Reduction as Inducement to Installation of New System Long Sought for City.

As an inducement for installation of a high-pressure water system in the National Capital, the Board of Fire Underwriters here, which represents all the fire insurance companies in the country, has decided to reduce the premium rates on downtown property 5 per cent if the system is installed.

This offer, which has just been decided upon by the Board of Fire Underwriters, will cover all property within the area proposed for a high-pressure water system—namely, from K street to the Mall and from North Capitol street to Nineteenth street, and will affect about $250,000,000 worth of private insurable property. If the high-pressure water system is not placed in downtown Washington, however, the National Board of Fire Underwriters, which has already made preliminary steps for its survey of conditions here, will not only be unable to reduce the rates, but, in the opinion of experts, will unquestionably have to raise them considerably.

**Praise Proposal.**

The offer to reduce the insurance rates here is considered by David Lee, chairman of the board of trade's insurance and fire protection committee which has advocated a high pressure system for 23 years, as a clear indication that the insurance companies of the country are concerned in the situation here. Mr. Lee and his committee feel that the offer is the most important development that has taken place since the high-pressure system has been advocated.

The committee regards this action as a plain inducement to the officials and business men of the National Capital to "remedy a serious and acute condition here."

Approximately $3,102,000 was paid in fire premiums in the District last year. Half of this amount was paid on property within the proposed high-pressure area. A reduction of 5 per cent would mean a saving of $75,000. If the system is not installed it will mean a raise in rates greater than the proposed reduction and the business men will not only loose $75,000 but probably will pay more than that in increased premiums. If the high-pressure system is installed, it is pointed out by the committee, the money saved soon would pay for the installation of the system and the lives, property and inconvenience incident to a big fire would at the same time be protected. In addition to this the Government would have a vastly greater protection for its buildings and irreplacable records which are not insured by private concerns.

The Board of Trade, which somewhat irked recently [illegible] covered that [illegible] be appropri[illegible] system [illegible] Bur[illegible] Mr[illegible]

**"...the money saved would soon pay for the installation of the system"**


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U. S. Ad 7
March 3, 1926

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**823 Caxton Building** **Cleveland, Ohio**

## Rotary Tool Joint Rate to be Reduced

WASHINGTON, March 1.—There will be a 15 per cent reduction in freight rates on rotary tool joints in Western Classification territory not later than April 3 if an order of the Interstate Commerce Commission on that matter is carried out on time. That body has decided, upon complaint of the Hughes Tool Co. of Houston, Tex., against all the railroads in the United States that the first class rating on rotary tool joints is too high and that second class would be proper, in the part of the country west of the Mississippi. Second class rating obtains in other parts of the country now.

The Hughes company will also have the difference between first and second class refunded to it on all shipments made in the two years prior to the filing of the complaint and on all shipments since that time, covering a period of more than three years.

The tool company asked for lower than second class on rotary drilling bits, fishing taps, milling tools and its "weight indicators," the name it gives the scales made by it for ascertaining the weight on the drill bit. The commission said there would be no less uncertainty as to the rate to be applied on that contrivance if the company called it a scale instead of using the patent name on the freight bills. The commission said that second class on the list of things mentioned in this paragraph was not unreasonable or otherwise unlawful.

The Republic Supply Co. and the Lucey Manufacturing Corp., of Texas, intervened on the side of the Hughes company and asked for reparation on shipments made by them. The report of the commission said they withdrew their prayer for reparation or refund so it awarded reparation only to the Hughes company.

## No. Carolina Auto Laws Being Studied

WINSTON-SALEM, N. C.—A survey of laws affecting the automotive industry in North Carolina is being made by Willis Smith, attorney at Raleigh, who will deliver the chief address at the opening session of the North Carolina Automotive Trade Association's annual convention here March 17 and 18.

Legislation which will permit notation of a mortgage on an automobile serving as a lien, with all records made at Raleigh instead of at the county when the sale is consummated, and in the county where the purchaser lives, is recommended by the association.

Automotive financing will be discussed at the meeting. Officers will be elected at the meeting. The second day will be devoted to the interests of automotive salesmen and a banquet and "oriental frolic" at the Country Club will conclude the convention.

# Tests Show Superiority of Cracked Fuel Over Straight Run Gasoline

By Arthur E. Wells
Indian Refining Co.

*Read Before Petroleum Division A. I. M. E., New York, Feb. 15.*

IN the last several years, especially during the past few months, there has been conducted considerable investigative work to determine and measure the relative anti-knocking qualities and power efficiency of cracked gasoline as compared with straight run gasoline. In this paper some of these investigations are reviewed briefly and certain data obtained by the writer is presented as further evidence on the subject.

It has been demonstrated that the tendency of a fuel to knock is largely dependent on its composition, certain constituents producing knocking more readily than others. Ricardo found that detonation by the fuel is largely dependent upon the normal rate of burning of the constituents and is less the lower the rate of burning.

### Relative Knocking Tendency

By various investigators (a) the rating of the above classes with respect to their anti-knock or detonating qualities is given as follows:

1—The paraffin hydrocarbons have the greatest tendency to knock.

2—The unsaturated, or olefin series are materially less inclined to knock than the paraffins.

3—The cyclic compounds have still less tendency to knock than the olefins.

4—The aromatic hydrocarbons—touol, benzol, are practically non-detonating under compression ratios of practical service in the automobile engine.

Ricardo demonstrated that the highest useful compresion and therefore the power output and efficiency obtainable in the internal combustion engine is governed by the relative proportions of those classes of hydrocarbons in the fuel being used. He worked out a compression ratio standard by which, when the percentage of olefins, naphthenes and aromatics are determined in a motor fuel, the highest useful compression ratio of the fuel may be estimated. According to Ricardo's data, four per cent of naphthene is equivalent to one per cent of toluene and five per cent of olefins is equivalent to one per cent of toluene.

### Accurate Test Method Lacking

Although accurate methods for determining quantitatively the several groups of hydrocarbon constituents in gasoline have been lacking until recently, it has become generally well known that cracked gasolines contain larger proportions of the unsaturated olefins and the cyclic compounds of naphthene and aromatic groups than do natural or straight run gasolines derived from eastern or Mid-Continent crude oils.

At this point mention should be made of the work that has been done recently in the research laboratories of the Universal Oil Products Co., by Dr. Egloff and Dr. Jacque C. Marrell (b) in developing a method of analysis for the paraffins, unsaturated olefins, naphthenes and aromatic hydrocarbons.

In general, the unsaturated hydrocarbons are determined by sulfonation and polymerization, the aromatic hydrocarbons by nitration and the naphthene hydrocarbons by the lowering of the anilin index. It is believed that the analytical procedure now developed holds promise of becoming a standard laboratory method of determining the groups of hydrocarbons in the fuel and will give practical information for determining the anti-knock qualities of motor fuels.

The percentages of the various groups of hydrocarbons obtained by analysis in the Universal Oil Products laboratories are converted into the aromatic hydrocarbon values, making use of Ricardo's data for the conversion of the unsaturated and napthene hydrocarbons. The aromatic hydrocarbon equivalents thus obtained by analytical methods have been found by those investigators to check with a good degree of accuracy the motor tests using known mixtures.

The complete details, together with the details of the results obtained by the application of this method and motor tests are to be published by Dr. Egloff and Dr. Morrell.

### No Recognized Standard

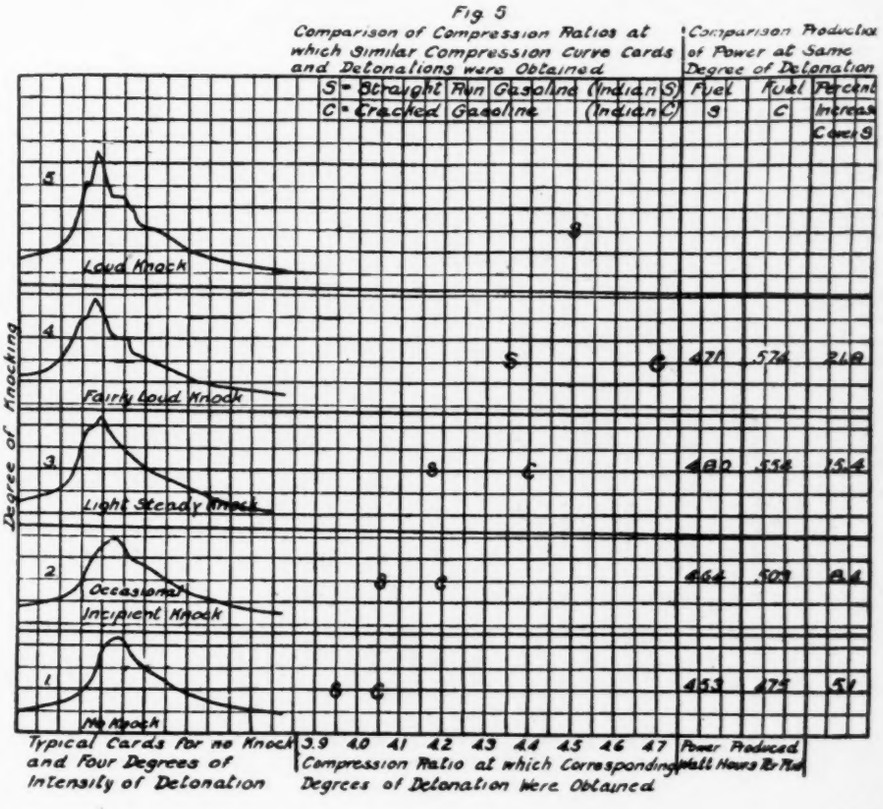
At present there is no recognized standard method for testing for anti-knock quality, the different investigators using different methods and it is difficult to compare the data of one investigator with those of another.

The method most generally used to determine the relative anti-knocking qualities of gasolines has been the "listening method" with various modifications. The intensity of detonation or knock caused by different gasolines has been compared with the spark advance or with the degree of manifold vacuum or the compression

(a) Harry Ralph Ricardo-The Internal Combustion Engine. Thomas Midgley Jr., Transactions of Society of Automotive Engineers (Vol. 17, 1922).

(b) A synopsis of the paper written by Egloff and Morrell concerning the development of their testing method and the tables of results they obtained was publishel in the Feb. 3 issue of National Petroleum News, page 83.

Fig. 5



ratio used in variable compression motors. These all depend on the keenness and accuracy of the observers to detect slight changes in the intensity of detonation and the results of such tests by different observers are, of course, difficult to correlate and compare.

By using the listening method in connection with the determination of the spark advance or retardation required to give equal knocks, Morrell and Egloff have found values of the aromatic hydrocarbon equivalents for various cracked gasolines ranging on an average between 20 and 50. (Aromatics equal 100; paraffins equal 0). For example, for cracked gasoline from Smackover heavy crude a value of 37 was obtained. From their data they have determined that cracked gasolines from various charging stocks are equivalent to a straight run gasoline of a Mid-Continent type blended with percentages of benzol varying from 18 to 50 per cent. These cracked gasolines have been shown by them, making use of Ricardo's data, to be capable of operating the most approved types of high compression motors.

Through the courtesy of Dr. Walter M. Cross and Dr. Roy Cross the facilities of the Kansas City Testing Laboratories were placed at the disposal of the writer to make some short comparative tests on several gasoline samples. With the cooperation of Mr. G. H. Clay of the Kansas City Testing Laboratories and Mr. Frank Apgar, research chemist of the Indian Refining Co., a short series of tests were made which will be described below.

A brief description of the equipment and method of test follows:

**Engine**—Single cylinder vertical Novo type, having a specially designed head with pistons for varying the compression with screw adjustment; bore five inches, stroke six inches; with Wico high tension magneto ignition, Zenith carburetor; capacity four horsepower at 500 r.p.m.

**Equipment**—Thee KW generator at 1150 r.p.m. 24 ampere 120-125 volt. Tachometer for engine speed, revolution counter, thermocouple for exhaust temperature, silent chain drive, 36 carbon light for load, explosion card apparatus with 250 pound spring, voltmeter, watthour meter, adjustable resistance thermometer for cooling water exit temperature.

### Average Test Conditions

Air temperature, 74-76 F.
Humidity average, 60 per cent.
Water outlet temperature 140 F.
Exhaust gas temperature 1125 F.
Average rate of fuel consumption, one pint in 11 minutes.
Revolutions per minute, 500.
Firing stroke per minute, 250.
Spark, 30 degrees advance.

The carburetor setting was constant during these tests giving an average exhaust, which based on previous tests with similar fuels was believed to contain about 12 per cent $CO_2$. No $CO_2$ measurements were actually made during the tests described below. It was noted, however, that in all cases the exhaust was clear of smoke.

### Single Cylinder Knocks Easier

Knocking takes place in the single cylinder with flat piston surfaces and with the spark at one side, at a much lower compression ratio than in a cylinder where the distance from spark to the farthest point of the cylinder is less, or in a multi-cylinder engine. Hence, the compression ratios at which knocking actually takes place are true only for this particular engine and would be greater for multi-cylinder engines or different designs of piston surfaces.

The piston rings were cleaned after each series of tests and all variables eliminated so far as possible. There were some slight variations in results with the same fuels from day to day as the temperature and humidity conditions of the air changed but under the same conditions practically the same intensity of knock and character of indicator card and power production were observed with the same compression ratio.

The following fuels were used for one series of tests:

S—Straight run gasoline produced from bubble cap tower of 5000 barrel pipe still at plant of Indian Refining Co. using Illinois crude.

C—Cracked gasoline from bubble cap tower of 1000 barrel Cross cracking unit at plant of Indian Refining Co. using gas oil from Illinois crude.

These fuels were analyzed for the various constituents by sulfonation and nitration methods with results which are not claimed to be definite but which are at least comparative, as follows:

### Analysis for Various Hydrocarbons

| | Gravity | Paraffins Per Cent | Olefins Per Cent | Cyclic and Aromatics Per Cent |
|---|---|---|---|---|
| S | 57.9 | 90 | 2.0 | 8.0 |
| C | 53.7 | 67 | 14.0 | 19.0 |

Figure 3 shows the comparative distillation charts and the gravity-volatility ratios of fuels S and C.

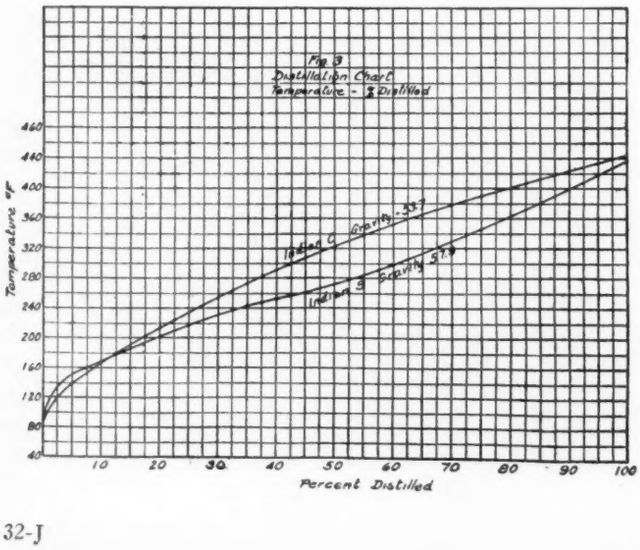
Figure 5 shows the comparison of the compression ratios and the point at which knocking began and where similar knocks or where indicator cards of the same characteristics were observed; also the power developed at those points.

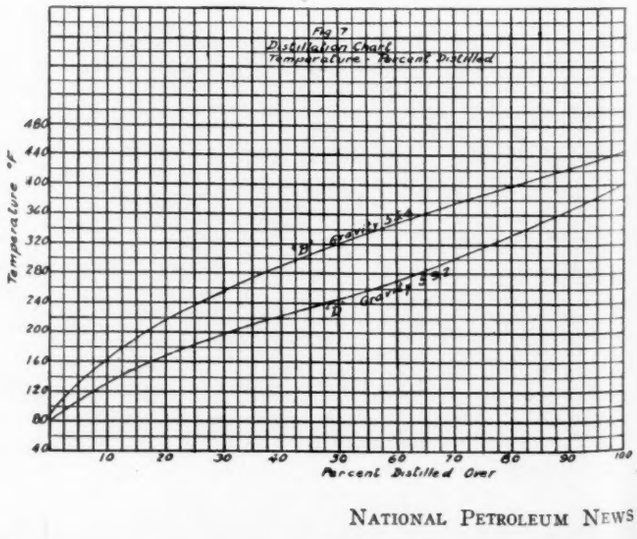
### High Compression, More Power

These curves indicate the relative efficiency of the fuels. At points of no knocking, allowing the same compression ratio, there was very little difference in the power developed by the two fuels. At the points where the fuels began knocking (indicator cards two and three) the cracked gasoline, working with a higher compression ratio, developed between eight per cent and 15 per cent more power than did the straight run gasoline. In the case of the straight run gasoline the power increased with the compression up to a ratio of 4.25 to 1 where slight steady knocking began. In the case of the cracked gasoline, the power was still increasing slowly at the point of greatest knocking at a compression ratio of 4.72 to 1 but the appearance of the curve shows that the point of greatest power output was practically reached.

The gravity-volatility ratios of all fractions of the two fuels were quite similar hence it was not possible to draw any conclusions from these tests that the ratios of these factors were measures of the anti-knocking qualities of the fuels, i.e., such conclusion as was drawn by Cross from his investigations.

By way of further demonstration of the anti-detonating qualities of the



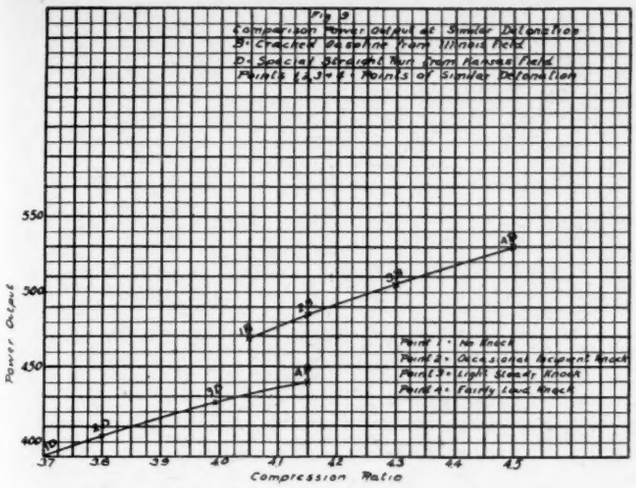
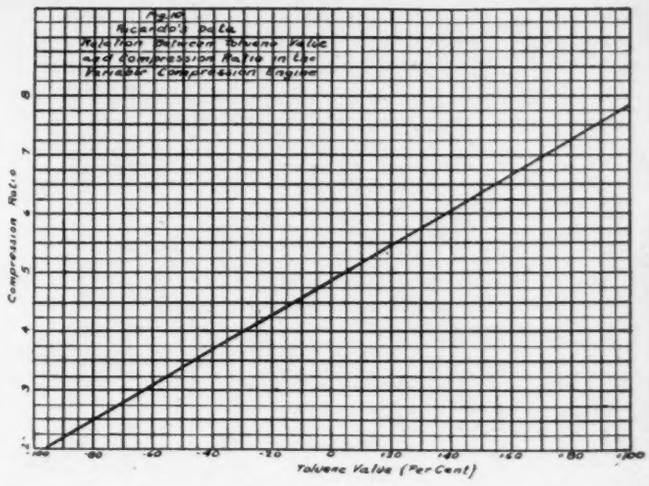


Fig 9
Comparison Power Output at Similar Detonation
B: Cracked Gasoline from Illinois Field
D: Special Straight Run from Kansas Field
Points 1,2,3 & 4 Points of Similar Detonation
Power Output
Compression Ratio
Point 1 - No Knock
Point 2 - Occasional Incipient Knock
Point 3 - Light Steady Knock
Point 4 - Fairly Loud Knock




cracked gasoline C and the same intentive tests were made with a 40 per cent benzol-60 per cent gasoline blend. With this blend, the point of initial knocking was approximately the same as for the cracked gasoline C and the same intensity of knocking was found at several higher compression ratio settings. No determinations were made of the power produced by the benzol-gasoline blend at those settings.

A second series of tests were run with the following fuels:

B—Cracked gasoline from Indian Refining Co. using Illinois crude.

D—Straight run gasoline from a Kansas crude known to have high paraffin content.

The distillation curves and the gravittyt-volatility ratios of Fuels B and D are given in Figure 7.

The straight run gasoline, D, was a much more volatile fuel than cracked gasoline B at all fractions. At 300 F. 70 per cent of D was volatile and only 45 per cent of B; the endpoint of D was 395 F, and of B, 442 F.

These were analyzed by the same methods that were used in the first series with results as follows:

## Analysis of Two Fuels Compared

| | Gravity | Paraffins | Olefins | Cyclic and Aromatics |
|---|---|---|---|---|
| Fuel B | 55.4 | 65 | 16.0 | 19.0 |
| Fuel D | 59.8 | 90 | 2.9 | 8.0 |

In Figure 9 are shown the compression ratios and the power output at points of the same degree of detonation or similar indicator cards for the above fuels.

The higher Baume gravity, high paraffin straight run gasoline D gave the first indication of knocking at 3.70 to 1 and a light steady knock at 4.0 compression ratio as compared with ratios 4.15 and 4.35 to 1 respectively for the same detonations when using the heavy gravity cracked gasoline B. At the point where knocking became evident, the cracked gasoline B produced from 18 to 20 per cent more power than did the straight run gasoline at the same point.

Several samples of other straight run gasoline, of cracked gasoline and of blended straight run and cracked gasolines which were on hand at the Kansas City Testing Laboratories were tried in the motor to compare the initial detonation point and the intensity of detonation with indicator card readings.

In all cases the cracked products or those having considerable proportions of cracked gasoline were found to be decidedly less detonating than the straight run products.

A special cracked product—one produced by the Cross processes—at an unusually high temperature and pressure—and reported to be high in the percentage of cyclic compounds had demonstrated previous to these tests an anti-detonating quality far superior to those cracked products used in the tests discussed above.

### Knocking Point Varies

The point of initial detonation in an engine will, of course, vary with many factors in addition to the character of the fuel. Among these are included such factors as the exact timing of the spark, the intake manifold vacuum, the setting of the carburetor, the location of the spark gap with reference to the center of the compressed vapor-air mixture at the time of the explosion, the design of the piston surfaces, the amount of carbon present and the atmospheric conditions.

In comparing the tests made by several investigators using variable compression engines these factors must be considered and to correlate the data readily they should be as nearly analogous as possible.

It would facilitate further the correlation of data if there was available a standard fuel having a definite, fixed volatility and with definite proportions of the several groups of hydrocarbons.

It would be difficult to establish a standard fuel for comparing anti-detonating qualities. It has been suggested in Midgley's paper, referred to above, that nearly pure hexane prepared by fractionating casinghead gasoline from the Pennsylvania field may be used for a standard, one portion being blended with detonation-inducing compounds and another portion blended with detonation suppressing material as benzol or toluol.

In discussing anti-detonation values, mention should be made also of the possibility that small amounts of nitrogen and sulfur compounds may also have an important effect in retarding detonation. It is recognized that anilin has an anti-knock value.

### Summary

Summarizing briefly the results of the tests described; samples of 54-55 Baume gravity cracked gasolines with end-point of about 442 F. and with a somewhat larger proportion of the less volatile fractions than conformable to government specifications, were used in a single cylinder variable compression engine under the same conditions as were samples of straight run gasoline of 58-59 Baume gravity, and of which one had a greater proportion of the more volatile fractions than called for in government specifications.

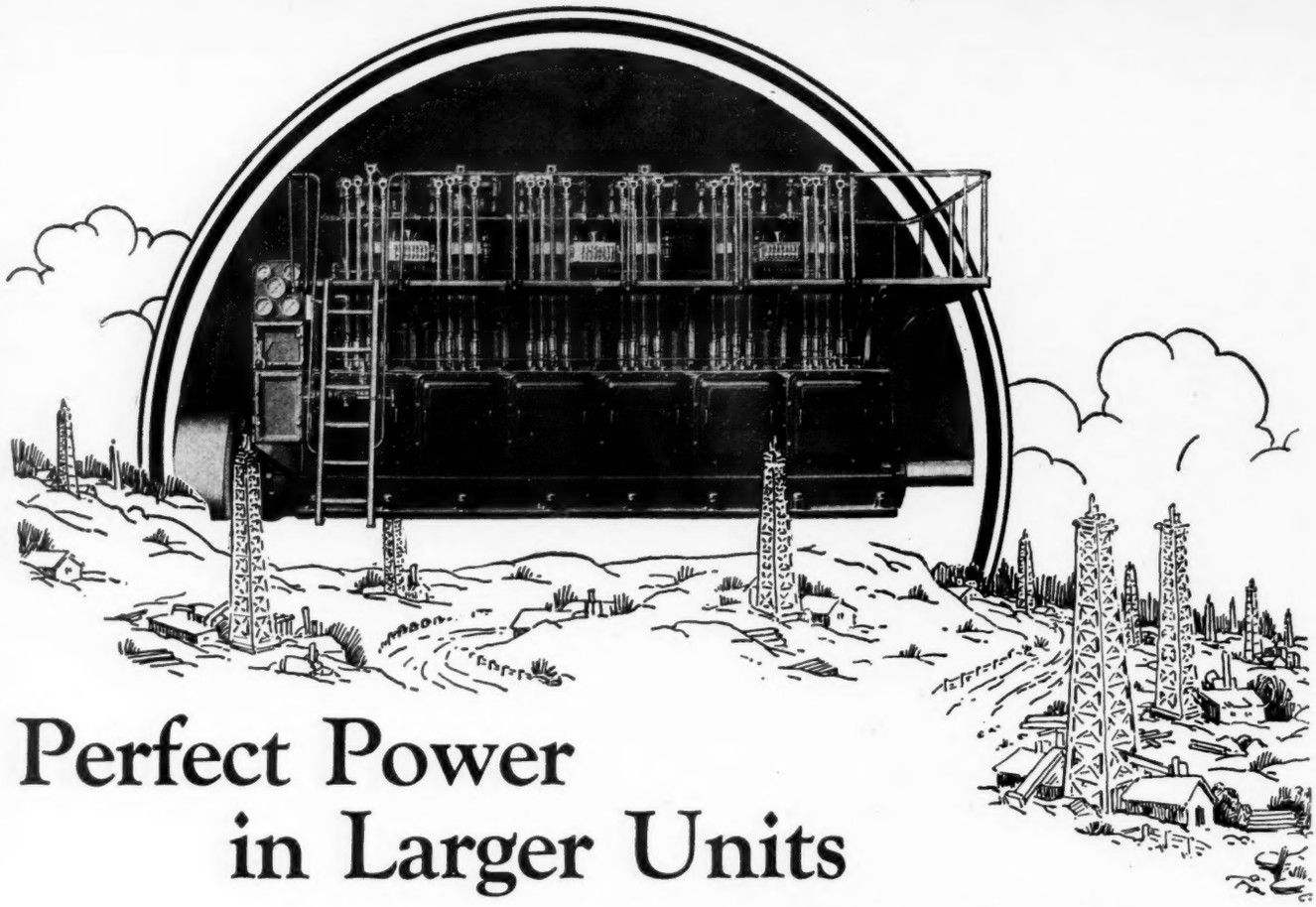
The cracked gasolines showed decidedly less tendency to knock, hence could be used at higher compression ratios and thereby developed from 10 per cent to 20 per cent more power than did the straight run gasolines. These figures may be taken as one measure of the superiority of the cracked gasolines under test to the straight run gasolines.

It is not claimed that all cracked gasolines are superior to all straight run gasolines to the extent indicated by the above tests; cracked gasolines vary as do straight run products.

Cross's work and that of others have indicated that certain cracked products may have a much greater superiority over straight run than that determined above.

From various sources and by different methods of testing, data are being obtained to show the definite and generally quite considerable superiority as an anti-detonating fuel of cracked gasolines over straight run gasolines.

It is now becoming generally recognized that by increasing the production of cracked gasoline motor fuels from these heavier petroleum fractions which otherwise would be used for burning purposes, the petroleum industry is not only working in the interest of the conservation of the world's supply of petroleum but is at the same time making available to the gasoline consuming public a product distinctly superior to the straight run gasoline.



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BESSEMER OIL FIELD ENGINES – COMPRESSORS VACUUM PUMPS – ROLLER PUMPING POWERS

# New Wells At Ingalls and Holdenville; Kansas Wildcat Again Flowing

By A. F. Hinton

N. P. N. Staff Writer

TULSA, Feb. 27

DURING the past week, Oklahoma production recorded its fifth successive weekly increase, having gone up constantly since the week ending Jan. 30, but having increased in that time only about 13,000 barrels altogether. A considerable part of that increase has been due to more intensive production methods in old, settled fields, which always comes as the result of a substantial advance in crude prices. When oil becomes more valuable, old, small-production wells are worked over, cleaned out and generally rehabilitated in order to bring their output up to maximum. Effects of this tendency in the present upward course of crude prices are just now becoming noticeable in the production tables.

The crude situation in Oklahoma and Kansas remains strong, in spite of recent gains in production. Crude is scarce and hard to find, and may be obtained at all only by the payment of a substantial premium over the regular posted market price. Davenport is the center of premium-paying activity as it was before the recent crude advance; but high-gravity crude in all fields is in keen demand.

Another increase in crude prices in the near future would not be surprising; in fact, surprise is expressed in some quarters it has not already occurred. It is probable that one principal reason why crude has not gone up again is the fact that prices were not raised in California during the recent nation-wide upward movement and have not advanced since. It is believed that, if California crude goes up, another Mid-Continent advance becomes practically a foregone conclusion.

Of chief interest in production news the past week has been the performance of the Kingman county, Kans., wildcat well of Fleeger and Carter Oil Co., which got back into the limelight after a period of comparative obscurity. This well was drilled about three feet deeper during the week, putting its total depth at 3890 feet, and at present is flowing something like 32 barrels an hour.

### Kingman County Wildcat

The Kingman county well made its first showing about Jan. 25, when it drilled itself in and started off at the rate of 500 barrels daily, afterward increasing this somewhat. Following the appearance of water in the hole, however, production began dropping off, and had gone down to about 50 barrels a day before the most recent deepening, much of the interest surrounding it going down with the production.

It was afterward stated that the water had been successfully shut off, but it has been hard to obtain accurate information as to the well's condition. Sand record of the well originally was 3875 to 3877 feet, so that it has now been drilled some 15 feet into the producing formation. After this week's deepening, the well made 27 barrels the first hour, 42 barrels the second, and 40 barrels the third, settling after that to a little better than 30 barrels an hour. At first, crude from the well was reported as having gravity of about 34 degrees, later reports having been to the effect it went off to about 29 degrees after the water appeared. It has been impossible to find out what the gravity is now, with the increased flow acquired through deepening.

Several wells have started up around the Carter-Fleeger well since it came in, and it is reported that dealing in leases has again approached the aspects of a boom following the new developments. T. B. Slick is drilling below 500 feet in his No. 1 Herman, east offset to the discovery well, in the NWc SW of 15-27-7W. Carter Oil Co. and P. F. Fleeger are building rig for their No. 1 Rayl, diagonal northeast offset to the first well, in the SWc NW of 15. J. A. Crawford et al. are moving in material for a test in the NEc NW of 31-28-5W, about 15 miles southeast of the Fleeger well for a deep test.

In the Wilcox sand field being developed near the town of Ingalls, Payne county, several big wells have been completed the last few days, and the district is now attracting considerable attention. The most recent well is the Olean Petroleum Co. No. 1 Farren, in the NEc of 23-19-4. This well made 1180 barrels in the past 24 hours in sand topped at 3721 feet. Roxana Petroleum Corp. No. 1 Stover, in the SWc of 13-19-4, a diagonal northeast offset to the Farren, made 2045 barrels in the past 24 hours, after having been deepened two feet to total depth of 3726 feet. This well got the Wilcox sand at 3710 feet.

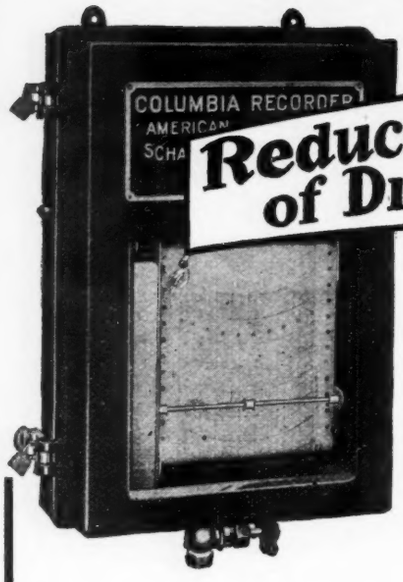
The discovery well in this pool was drilled in last fall and has been producing more than 1000 barrels daily since that time. It is the Olean Petroleum Co., No. 1 Pleasants and is located in the NWc of 24-19-4. It topped the Wilcox sand at 3715 feet. During the past week it was deepened one foot; being now 3722 feet and in the ensuing 24 hours flowed 1715 barrels. This company is drilling a well in the SEc of 14, diagonal northwest offset to the discovery and it should be the next well in, as it is drilling below 3640 feet. Ozark Pipe Line Co., transportation end of the Roxana Petroleum Corp., is laying a line into the field.

In connection with the Olean operations in this pool, it was reported during the week that Wilson K. Page and associates, of Olean, N. Y., sold their holdings in the Olean Petroleum Co. to William A. Dusenberry, president of the First National Bank of that city.

Consideration was reported to be $3,000,000. The Olean Co. has many valuable producing properties in addition to the Ingalls lease, and has been active throughout Oklahoma. Its offices are

## Drilling Operations in Oklahoma, Kansas and North Texas

| | Week Ending Feb. 27 | | | | | Week Ending Feb. 20 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Loc. | Rigs. | Drg. | S.D. | Total | Loc. | Rigs. | Drg. | S.D. | Total |
| **OKLAHOMA** | | | | | | | | | | |
| Burbank | 1 | 2 | 15 | ... | 18 | 1 | 2 | 15 | ... | 18 |
| Other Osage | 3 | 13 | 47 | 11 | 74 | 3 | 13 | 47 | 11 | 74 |
| Bristow-Cushing | 32 | 36 | 181 | 30 | 279 | 32 | 40 | 168 | 31 | 271 |
| North Oklahoma | 6 | 28 | 147 | 78 | 259 | 8 | 25 | 148 | 11 | 262 |
| South Oklahoma | 17 | 32 | 134 | 41 | 224 | 16 | 30 | 130 | 41 | 217 |
| Muskogee | ... | 6 | 47 | 9 | 62 | ... | 14 | 46 | 11 | 71 |
| Okmulgee-Bristow | 5 | 55 | 107 | 28 | 195 | 3 | 54 | 103 | 34 | 194 |
| Tonkawa | 1 | ... | 6 | 1 | 8 | ... | 1 | 5 | 1 | 7 |
| Wewoka-Cromwell | 10 | 35 | 104 | 25 | 164 | 11 | 25 | 102 | 23 | 161 |
| Total Oklahoma | 75 | 197 | 788 | 223 | 1283 | 74 | 204 | 764 | 233 | 1275 |
| KANSAS | 71 | 103 | 260 | 128 | 562 | 73 | 95 | 271 | 135 | 574 |
| **NORTH TEXAS** | | | | | | | | | | |
| Eastland County | ... | 3 | 37 | 4 | 44 | ... | 2 | 43 | 4 | 49 |
| Stephens County | ... | 20 | 36 | 10 | 66 | ... | 15 | 30 | 15 | 60 |
| Texas Panhandle | ... | 37 | 65 | 18 | 120 | ... | 37 | 61 | 17 | 115 |
| Mexia District | ... | 1 | 1 | 4 | 6 | ... | 1 | 1 | 4 | 6 |
| E. Texas Wildcats | ... | 7 | 7 | 13 | 27 | ... | 7 | 7 | 13 | 27 |
| W. Texas Wildcats | ... | 30 | 202 | 96 | 328 | ... | 70 | 168 | 86 | 324 |
| Wichita Falls | ... | 78 | 201 | 43 | 322 | ... | 94 | 162 | 36 | 292 |
| Total N. Texas | ... | 176 | 549 | 188 | 913 | ... | 226 | 472 | 175 | 873 |
| GRAND TOTAL | 146 | 476 | 1597 | 539 | 2758 | 147 | 525 | 1507 | 543 | 2722 |

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—Whether the crew is working at highest efficiency or laying down on the job.

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at Bristow, which has been the center of its operations in recent years.

### Holdenville District

Interest in the district around Holdenville, Hughes county, which has been at a low ebb for some time, following the expensive drilling orgy in 35-8-8 which came to nothing, was revived during the week with reports of a good well. This was the Kingwood Oil Co. No. 1 Lowe, in the NE SW SE of 29-8-9, about half way between Holdenville and the Yeager pool, which also was a very disappointing development.

The Kingwood well had what is thought to be the Papoose sand at 3418 feet, and started making 10 million feet of gas daily. The gas increased to about 30 million feet with deepening and the oil pay was found at 3429 feet. The first day's production after touching the oil sand was 480 barrels. It will be drilled farther in as soon as preparations for handling more production have been completed.

Holdenville is the general center of operations for all the south country and has been quiet recently. The 35-8-8 development was just west of Holdenville and started off like it would be a big field, but now has 10 wells making less than 150 barrels all told. Something like 35 wells started drilling on the strength of the discovery well in this field and a great deal of money was spent in a hurry. The Yeager field has 13 wells making 820 barrels, most of which is on properties of the Dixie Oil Co. This pool also saw some expensive deep failures.

### Wells Completed

In Oklahoma, during the week just closed, 66 wells were completed, of which 39 were oil wells, seven gas wells, and 20 dry holes. This compares with last week's report which included 79 completions, divided 42 oil wells, seven gas wells, and 30 dry holes.

The 39 oil wells included in this week's report had a total initial production of 11,865 barrels, giving them an average of 304.2 barrels per well. Last week, 42 wells brought in 22,495 barrels of new production, with a per-well average of 535.6 barrels, the highest recorded in Oklahoma in some time.

Completions reported from Kansas this week totaled 35, of which 18 were oil wells, four gas wells, and 13 dry holes. Last week, there were 28 Kansas completions, divided 10 oil wells, one gas well, and 17 dry holes. The 18 oil wells this week had total initial output of 1,435 barrels, or an average of 79.7 barrels each. Last week 10 wells accounted for only 866 barrels of new production, with a per-well average of 86.6 barrels.

### Current Production

Garber deep sand production is now 21,540 barrels a day from 51 wells, which are also making 14,510 barrels of salt water each 24 hours. This was the field's daily average during the past week. Sinclair Oil & Gas Co. has 25 wells making 17,935 barrels of oil, all

# Completions in Oklahoma and Kansas, Week Ended Feb. 27

## OKLAHOMA

### Carter County

| Company | Well No. | Location | Depth | Initial Production |
|---|---|---|---|---|
| Schermerhorn | 1 | C SE SE NW 34-1-3W | 3138–3159 | 225 |
| Merrick-Kirk | 4 | NWc SW 5-3-2W | 2532–3346 | 60 |
| Simpson-Fell | 2 | NWc SE SW NW 9-4-2W | T.D.2858 | Dry |
| Amerada | 3 | CEL W½ NW NW 34-5-1E | T.D.1349 | Dry |

### Creek County

| | | | | |
|---|---|---|---|---|
| Tidal | 3 | SEc NE NW 19-17-10 | 2109–2147 | 13 |
| Wright | 2 | NWc SE SE 23-17-10 | 2492–2502 OWD | 460 |
| Gladys Belle | 3 | NWc SW SW 17-14-10 | 2848–2856 | 350 |
| Phillips | 4 | NEc NW SW 13-14-8 | 2370–2400 | 35 |
| Cole Shaffer | 1 | NEc NW NW 4-17-11 | T.D.2466 | Dry |
| Slater et al | 2 | CEL NW SE 34-16-9 | T.D.2996 | Dry |
| Skelly | 1 | NEc SE NE 11-16-11 | 2615 T.D. | Dry |
| Independent | 2 | NWc SW SE 29-15-10 | T.D.3276 | Dry |
| Skelly | 2 | NEc NW SE 29-15-10 | T.D.3665 OWD | Dry |
| Quinlan et al | 2 | SEc NW SW 17-14-10 | T.D.3457 | Dry |

### Garvin County

| | | | | |
|---|---|---|---|---|
| Honaokla | 3 | SEc SW NW SW 11-1-3W | 1370–1396 | 20 |

### Hughes County—Papoose

| | | | | |
|---|---|---|---|---|
| Empire | 4 | C SE SE NW 26-9-9E | 3425–3430 | 400 |
| Transcontinental | 6 | C SW NW SW 26-9-9E | 3340–3350 | 30 |
| Independent | 1 | C SE NE NE 27-9-9E | T.D.3465 | Dry |

### Hughes County

| | | | | |
|---|---|---|---|---|
| Brock | 1 | C SW SW NW 28-7-8E | 4336–4340 | 120 |

### Kay County

| | | | | |
|---|---|---|---|---|
| Tidal | 2 | C NW SE 8-27-1W | 3456–3470 | 16M |

### Kay County—N. Braman

| | | | | |
|---|---|---|---|---|
| Comar | 2 | SWc SE 21-29-1W | 2095–2108 | 230 |

### Kay County—S. Braman

| | | | | |
|---|---|---|---|---|
| Davis | 1 | Blk 2, Lot 2 | T.D.3542 | 60 |

### Kay County—Thomas

| | | | | |
|---|---|---|---|---|
| Marland | 4 | C NW SW SW 15-25-2W | 4032–4062 | 3002 |
| Carter | 4 | C NW NE NE 21-25-2W | 4142–4205 | 90 |
| Marland-Phillips | 1 | C NW NW SW 22-25-2W | T.D.4817 | Dry |

### Lincoln County—Davenport

| | | | | |
|---|---|---|---|---|
| Carter | 4 | SEc NW NE 2-14-5 | 3287–3404 | 85 |
| Magnolia | 13 | NEc NW SW 2-14-5 | 3292–3387 | 200 |
| Skelly | 5 | SWc SE NE 2-14-5 | 3320–3368 | 720 |
| Texas | 4 | NWc SW SE 2-14-5 | 3309–3385 | 1100 |
| Texas | 6 | SEc NW SE 2-14-5 | 3302–3381 | 625 |
| Southwestern | 1 | NWc NE 11-14-5 | 3365–3411 | 962 |
| Prairie | 16 | SWc NW NW 3-14-5 | 3419–3457 | 225 |
| Prairie | 1 | NEc NE SE 7-15-6 | 4076–4079 | 20 |

### Lincoln County

| | | | | |
|---|---|---|---|---|
| Mid-Cont | 2 | SWc NW NW 8-15-8 | 4028–4035 | 1128 |

### Noble County

| | | | | |
|---|---|---|---|---|
| Belt | 1 | C SE SE 29-21-1E | T.D.1723 | Dry |

### Noble County—Tonkawa

| | | | | |
|---|---|---|---|---|
| Wentz | 10 | C SE SE SE 30-24-1W | T.D.4585 OWD | Dry |

### Okfuskee County

| | | | | |
|---|---|---|---|---|
| Amerada | 11 | SEc NW 13-12-11 | 3350–3362 | 282 |
| Empire | 1 | NWc NE NW NE 30-11-10 | 2958–2965 OWD | 17M |
| Windsor | 7 | CNL SW 22-11-11 | T.D.4000 | Dry |

### Okmulgee County

| | | | | |
|---|---|---|---|---|
| Vierson | 2 | SEc NE NW NW 35-15-12 | 1867–1903 | 18M |
| Johnson | 3 | SWc NW SW NW 22-14-12 | 1978–1984 | 150 |
| Marcey et al | 4 | CWL SE NW 8-13-12 | 2183–2220 | 150 |
| Independent | 1 | SEc NE NW 18-12-12 | 2540–2546 | 200 |
| Wallace | 2 | NEc NW NW 14-14-14 | 1790–1802OWD | 20 |
| Misener | 4 | CEL SE SE 24-14-14 | 1193–1198 | 8 |
| Windland et al | 12 | NEc SE NE SE 8-14-15 | 1476–1488 | 4M |
| Lebow | 11 | CEL NE SW 15-13-14 | 1900–1915 | 590 |
| Cuseck | 2 | NWc SW NE 29-13-14 | 1667–1669 | 100 |
| Pulaski | 10 | NWc SW SW 36-12-13 | 2895–2907 | 50 |
| Holmes et al | 1 | SEc 31-16-13 | 2492 | Dry |
| G & M | 1 | CEL SW 19-15-12 | 2785 | Dry |
| Terrien | 1 | SEc NE NW 31-15-13 | T.D.2738 | Dry |
| Cline | 5 | SEc SW NW 19-15-14 | 2280 | Dry |
| Magnolia | 10 | NEc NW 1-11-13 | T.D.3220 | Dry |

### Pawnee County

| | | | | |
|---|---|---|---|---|
| Gypsy | 13 | CSL NE NE 35-12-8 | 2368–2402 OWD | 7 |
| Prairie | 5 | SWc 15-20-6 | 3093–3126 OWD | 25 |

### Seminole County

| | | | | |
|---|---|---|---|---|
| Southwestern | 1 | C NE SE NE 18-9-9E | 3310–3336 | 60 |

### Sequoyah County

| | | | | |
|---|---|---|---|---|
| Lyman | 1 | NEc SW 15-11-26 | 2265–2285 | 4M |

### Tulsa County

| | | | | |
|---|---|---|---|---|
| Prairie | 4 | NEc SW 4-16-13 | 2113–2124 | 15 |
| Prairie | 4 | NEc SW 4-16-13 | T.D.2113 OWD | Dry |
| Holmes et al | 2 | NWc SE NW 22-19-11 | 2252–2256 | 30 |
| Chandless et al | 1 | NWc SE NE 17-18-13 | 1598–1633 | 5 |
| Enfisco | 16 | NWc SE SW 18-17-13 | 1780–1796 | 15 |
| Suppees et al | 1 | NEc NW SE 9-16-12 | T.D.2397 | Dry |

### Wagoner County

| | | | | |
|---|---|---|---|---|
| Neal-Cartwright | 2 | NWc 35-18-16 | 560– 580 | 2M |
| Wilson et al | 1 | SEc NE SW 11-16-16 | 801– 880 | 7M |

## KANSAS

### Butler County

| | | | | |
|---|---|---|---|---|
| Empire | 84 | C N½ NW 28-25-5E | 664– 657 | 20 |
| Rogers | 8 | CWL SW NW 29-26-8 | 2656–2739 | 50 |
| Empire | 15 | NWc SW NW 36-27-4 | 2520–2553 | 100 |
| Day et al | 1 | NEc NW NW 7-27-7 | T.D.2788 | Dry |
| White Eagle | 1 | SWc SE NW 25-28-6 | T.D.3282 | Dry |
| Atlantic | 2 | NEc SE SW 15-28-7E | T.D.3244 | Dry |

### Chase County

| | | | | |
|---|---|---|---|---|
| Reed et al | 1 | NWc SE 17-22-9 | T.D.2635 | Dry |

### Elk County

| | | | | |
|---|---|---|---|---|
| Roth | 13 | SEc NE SW 12-29-9 | 2032–2057 | 40 |
| Gillespie | 1 | SEc SW NW 29-31-1 | 1950–1960 | 2M |

### Greenwood County

| | | | | |
|---|---|---|---|---|
| Empire | 6 | SEc SW NW 14-22-11 | 1873–1933 | 75 |
| Simmons et al | 1 | NWc NE NW 4-22-12 | 1868–1897 | 250 |
| Manhattan | 20 | NEc NW SE 10-23-9 | 2310–2368 | 100 |
| Pure | 6 | NWc SW NW NW 26-23-10 | 2270–2310 | 40 |
| Roth et al | 4 | C E½ W½ NE 27-23-10 | 2307–2370 | 10 |
| Theta | 22 | NWc 10-23-13 | 1523–1560 | 25 |
| McGinnis et al | 3 | NEc SW 30-24-11 | 1761–1689 | 200 |
| Mid-Kansas | 6 | NWc SW SW NW 20-25-9 | 2342–2392 | 150 |
| Roth-Faurot | 1 | SWc SE 2-26-11 | 612– 625 | 2M |
| Roth-Faurot | 2 | SEc NW SE SE 9-23-10 | T.D.2330 | Dry |
| Prairie | 3 | CSL NE 16-24-13 | 1625–1654 | 60 |

### Lyon County

| | | | | |
|---|---|---|---|---|
| Abel et al | 1 | NWc 7-21-10 | T.D.2425 | Dry |
| Ritchey-Moore | 2 | NEc SE SW 34-21-10 | T.D.2612 | Dry |
| Phillips | 5 | NWc NE SW 33-21-12 | T.D.1964 | Dry |
| Ritchey-Moore | 5 | SWc SE SW 34-21-10 | 2180- 2224 | 150 |
| Phillips | 2 | SEc NE SE 32-21-12 | 1900–1928 | 20 |
| Phillips | 4 | NWc SW SW 33-21-12 | 1903–1930 | 20 |
| Phillips | 6 | SEc NW SW 33-21-12 | 1867–1930 | 100 |

### Montgomery County

| | | | | |
|---|---|---|---|---|
| Superior | 1 | NWc NE SE 12-33-16 | 1279–1281 | 25 |
| Weibel et al | 1 | SEc NW NE 30-33-16 | 1050–1057 | 1M |
| Kerns | 1 | SEc NE SW 1-35-16 | T.D.1285 | 7M |
| Morgan et al | 1 | NEc SW 23-33-14 | T.D.1740 | Dry |
| Wilkins et al | 1 | NEc SE SE 11-33-16 | 1380 | Dry |
| Connell et al | 1 | SEc NW 31-34-15 | T.D.1690 | Dry |
| Keystone | 1 | NEc SE NW 5-35-15 | T.D. 125 | Dry |

### Woodson County

| | | | | |
|---|---|---|---|---|
| Fields et al | 1 | NEc SE 9-23-13 | T.D.1710 | Dry |

other companies having only 3,515 barrels from these once prolific wells.

Davenport's production averaged 21,061 barrels the past week, from 132 wells, a loss of 1,509 barrels in production and an increase of two wells. Stroud had the same number of wells this week as last, 71, and declined 398 barrels in production, averaging 2,182 barrels. Skellyville, northwest of Stroud, had eight wells making 1,982 barrels daily, a decline of 232 barrels and the same number of wells. Cromwell had 406 wells, the same as the preceding week and averaged 19,736 barrels daily, a gain of 114 barrels. Papoose declined 969 barrels to 14,062 barrels daily, and had 218 wells, same as the week before.

The Wewoka deep sand wells, now four in number made more oil than all the 140 shallower wells in the field. The Wilcox sand wells averaged 8,704 barrels daily, a decline of 1,699 barrels, while remaining wells made 8,611 barrels daily, a loss of 91 barrels. Tonkawa averaged 42,249 barrels from 778 wells, a decline of 506 barrels and the same number of wells. The Wilcox sand wells in that field totaled 134 and accounted for 29,926 barrels of the field's total output.

North Braman added one well for a new total of 34, but declined 343 barrels to 2,097 barrels daily. South Braman, the townsite field, also added one well, making 22 in all, and declined 227 barrels to 8,286 barrels daily. The Watchorn field, western Pawnee county, declined 245 barrels to 2,657 barrels daily, from 22 wells, the same as the week before. Thomas, which has been declining rapidly of late, went off only 233 barrels to 9,366 barrels a day, from 20 wells, no change. Hubbard had 33 wells, same as the week before, making 2,128 barrels, a gain of 95 barrels. Burbank averaged 44,941 barrels, a loss of 338 barrels, and had 1818 wells, the same as the week preceding.

### Highway Safety Body to Meet

GREENSBORO, N. C.—The Carolina Motor Club's representatives at the National Conference on Street and Highway Safety at Washington, D. C., on March 22 to 24, will include C. T. Matthews, director of accident prevention, and C. W. Roberts, vice president, and also secretary of the North Carolina Automotive Trade Association.

Herbert Hoover, Secretary of Commerce, who organized the conference two years ago, is chairman of the body, which is composed of state, municipal, civic and motor organization officials. Methods of accident reduction and suggestions for co-operative work is the aim of the conference.

# Completions in East and Central Texas, Week Ended Feb. 27

| Company | Well Farm | Location Survey | Depth | Initial Prod. |
|---|---|---|---|---|
| **Archer County** | | | | |
| Young | 3-Abney | SP | 423– 433 | 5 |
| W. Phillips | 14-Wilson | Howard | 1699–1704 | 70 |
| Burns-Maxson | 1-Jackson | Aldridge | 1546–1551 | 20 |
| Burns-Maxson | 4-Brown | Geraldine | 1375–1586 | 40 |
| Gulf | 3-McCroy | ATNC | 1394–1403 | 35 |
| Pandem | 6-Hutchinson | ATNC | 1379–1390 | 25 |
| Beasley | 1-Wolfe | SP | 1338–1352 | 60 |
| Primrose et al | 5-Wolfe | SP | 1338–1343 | 10 |
| Texhoma | 11-Oldham | Hubble | 1326–1355 | 270 |
| Texhoma | 3-Wolfe | Hubble | 1313–1348 | 230 |
| Texas | 18-Hill | TEL | 1393–1401 | 15 |
| Wampum | 2-Kreeger | TEL | 1415–1419 | 150 |
| American | 6-Portwood | TEL | 1401–1409 | 15 |
| Magnolia | 7-Portwood | TEL | 1412–1421 | 9 |
| Magnolia | 8-Portwood | TEL | 1411–1417 | 25 |
| Stump | 1-Mangold | Wright | T.D.1858 | Dry |
| Texhoma et al | 1-Wilson | ATNC | T.D.1751 | Dry |
| Consolidated | 3-Turberville | Carson | T.D.1460 | Dry |
| Riner-Bailey | 2-Wilson | ATNC | T.D.1645 | Dry |
| Hart | 1-Fuch | H&W | T.D.1803 | Dry |
| Grisham et al | 1-Wilson | Walker | T.D.1650 | Dry |
| Sun | 16-Farmer | SP | T.D.1605 | Dry |
| Texhoma | 1-Abercrombie | SP | T.D.1403 | Dry |
| Carter et al | 1-Turberville | Jefferson | T.D.1352 | Dry |
| Pandem | 1-Young | TEL | T.D.1500 | Dry |
| Consolidated | 2-Kreeger | TEL | T.D.1453 | Dry |
| Consolidated | 3-Kreeger | TEL | T.D.1480 | Dry |
| Gulf | 1-Hayter | TEL | T.D.1506 | Dry |
| Murchison-Fain | 1-Wright | TEL | T.D.1504 | Dry |
| Murchinson et al | 1-Kunkle | McCoy | T.D.1265 | Dry |
| Tex-Unity | 1-Morrison | TEL | T.D.1450 | Dry |
| **Baylor County** | | | | |
| Cosden | 1-Garner | BBB&C | T.D.2912 | Dry |
| **Brown County** | | | | |
| Roberts | 1-Smith | Delgado | T.D.1250 | Dry |
| Cowboy Evans | 1-Dunn | Delgado | 1084–1087 | 125 |
| States | 1-Allen | Delgado | 1084–1094 | 9M |
| Gillespie | 1-Newton | Swain | 1298–1317 | 30 |
| Conway | 3-Pickett | Logan | 1280–1299 | 50 |
| **Cooke County** | | | | |
| Red River | 2-Whaley | Clement | T.D.2200 | Dry |
| **Clay County** | | | | |
| Mike Sullivan | 2-Bullington | Thornberry | T.D.1400 | Dry |
| **Coleman County** | | | | |
| Canyon | 1-Harris | Sanders | T.D.3130 | Dry |
| **Crockett County** | | | | |
| Cook | 1-Univ. | University | T.D.3253 | Dry |
| **Eastland County** | | | | |
| Eastland | 1-White | Kendrick | T.D.3525 | Dry |
| **Hutchinson County** | | | | |
| Canadian River | 1-Kingsland | M&C | 2858–2938 | 120 |
| **Mitchell County** | | | | |
| Magnolia | 1-Watson | TP | 2850–2870 | 45 |
| **Montague County** | | | | |
| Texhoma | 4-Chambliss | | 1365–1381 | 57 |
| Texhoma | 5-Chambliss | | 1106–1116 | 42 |
| Benton-Woods | 1-Hynd | Wall | 963– 973 | 100 |
| **Palo Pinto County** | | | | |
| Adams et al | 2-Pollard | TP | T.D.4075 | Dry |
| **Reagan County** | | | | |
| University | 1-Univ. | University | T.D.3180 | Dry |
| **Shackelford County** | | | | |
| Brigham | 1-King | TEL | T.D. 526 | Dry |
| Carter | 1-Proctor | Whistler | T.D.2000 | Dry |
| Cerf | 1-Poindexter | TP | T.D.2700 | Dry |
| **Stephens County** | | | | |
| Tripplehorn et al | 1-Walker | TP | 3570–3580 | 70 |
| Tex-Pac | 58-Binnery | TP | 1872–1895 | 25 |
| Gardner et al | 2-Cunningham | TEL | 3181–3192 | 30 |
| **Throckmorton County** | | | | |
| Humble | 2-Stubblefield | TEL | T.D.3245 | 135 |
| **Wichita County** | | | | |
| Howell et al | 1-Hines | GH&GN | 1392–1395 | 75 |
| Compton | 1-Hitschi | Cowan | T.D.2795 | Dry |
| DeYarnatt-Dyson | 1-Holder | Wheelright | T.D.1699 | Dry |
| Johnson-Schultz | 1-Freidly | H&GN | T.D.2000 | Dry |
| Cooper-McLaughlin | 1-Love | Kinnard | T.D.1850 | Dry |
| **Wilbarger County** | | | | |
| Wood et al | 1-McGill | H&TC | T.D.1045 | Dry |
| Wood et al | 1-Dennis | H&TC | T.D.2612 | Dry |
| Broughton et al | 1-Waggoner | H&TC | T.D.2450 | Dry |
| Skelly-Gray | 1-Waggoner | BS&F | T.D.2406 | Dry |
| Humble | 34-Stephens | H&TC | 2027–2052 | 45 |
| Humble | 35-Stephens | H&TC | 2340–2400 | 450 |
| Humble | 38-Stephens | H&TC | 2317–2388 | 160 |
| Humble | 39-Stephens | H&TC | 2326–2380 | 275 |
| Humble | 40-Stephens | H&TC | 2353–2388 | 35 |
| Gulf | 4-Waggoner | H&TC | 1928–1935 | 50 |
| Roxana | 1-Waggoner | H&TC | 2396–2414 | 224 |
| Humble | 4-Waggoner | H&TC | 1868–1892 | 225 |
| Landreth | 11-Waggoner | H&TC | 1863–1892 | 110 |
| Landreth | 8-Waggoner | H&TC | 1883–1898 | 50 |
| Landreth | 1-Waggoner | H&TC | 2292–2301 | 90 |
| Roxana | 4-Waggoner | H&TC | 1924–1931 | 98 |
| Roxana | 5-Waggoner | H&TC | 1921–1949 | 218 |
| **Young County** | | | | |
| Bridwell et al | 5-Boren | Newman | 1070–1075 | 175 |
| Bridwell et al | 6-Boren | Newman | 1063–1078 | 100 |
| Humble | 1-Farmer | Anderson | 1066–1086 | 5 |
| Texas-Prairie | 3-Boren | Newman | 1064–1080 | 58 |
| Camp | 3-Campbell | TEL | 908– 915 | 7 |
| Tidal | 18-Campbell | TEL | 899– 916 | 57 |
| Gulf | 3-Campbell | TEL | 923– 917 | 35 |
| Atlantic-Donoho | 1-Wainscott | TEL | T.D.1400 | Dry |
| Bridwell-Mayfield | 2-Street | TEL | T.D.1325 | Dry |
| Tidal | 19-Campbell | TEL | T.D. 950 | Dry |
| Gragg et al | 1-Graham | TEL | T.D.1150 | Dry |
| Simms | 1-McCoghren | TEL | T.D. 956 | Dry |
| Golding-Cochran | 1-McClatchey | TEL | T.D.1002 | Dry |
| Daniel | 1-Haley | TEL | T.D.1004 | Dry |
| Carey | 1-Thomas | TEL | T.D.1003 | Dry |
| Atlantic | 1-Chandler | TEL | T.D. 902 | Dry |
| Wright et al | 1-Haley | TEL | T.D.1004 | Dry |

# Completions in North Louisiana and Arkansas, Week Ended Feb. 25

| Company | Well | Location | Depth | Yield |
|---|---|---|---|---|
| **LOUISIANA** | | | | |
| **LaSalle Parish—Urania** | | | | |
| Atlantic Oil Prod. Co. | Tullos No. 2 | 26–10–1E | 1525 | 50 |
| B. & B. Drilling Co | Russell No. 1 | 26–10–1E | 1555 | 95 |
| O. W. Clark, trustee | Miles No. 2 | 25–10–1E | 1540 | 400 |
| O. W. Clark, trustee | Russell B-1 | 26–10–1E | 1552 | 100 |
| Daniels et al | H. Tullos No. 1 | 26–10–1E | 1560 | 1000 |
| Dixie Oil Co | Urania No. 2 | 24–10–1E | 1575 | 75 |
| Hunt et al | Tullos Heirs No. 1 | 26–10–1E | 1490 | 45 |
| Louisiana Oil Ref. Corp. | Fee No. 1 | 25–10–1E | 1535 | 250 |
| Louisiana Oil Ref. Corp. | Tremont Lbr. Co. A-3 | 30–10–2E | 1555 | 30 |
| Louisiana Oil Ref. Corp. | Tremont Lbr. Co. B-17 | 25–10–1E | 1538 | 2000 |
| Louisiana Oil Ref. Corp. | Tremont Lbr. Co. B-26 | 25–10–1E | 1533 | 200 |
| Standard Drilling Co | Clinton No. 1 | 26–10–1E | 1350 | 500 |
| Standard Oil Co. of La | Urania No. 1 | 19–10–1E | 1568 | 100 |
| Standard Oil Co. of La | Urania No. 2 | 19–10–2E | 1571 | 20 |
| Tullos Oil Co. (Standard of Ind.) | Miles No. 1 | 25–10–1E | 1540 | 200 |
| **Webster Parish—Cotton Valley** | | | | |
| Ohio Oil Co | Bodcaw No. 35 | 21–21–10 | 2577 | 10 |
| Ohio Oil Co | Riggin Cox No. 2 | 15–21–10 | 2545 | 25 |
| Ohio Oil Co | A. J. Hodges No. 1 | 23–21–10 | 4415 | 3 m. ft. gas heavy with gaso. |
| Palmer Corp | Davis No. 1 | 23–21–10 | 4625 | 8m. ft. gas |
| **Caddo Parish—Caddo District** | | | | |
| Dixie Oil Co | Clark et al No. 7 | 14–21–15 | 1810 | 10 |
| Lewis Oil Corp | Vespy No. 5 | 15–21–15 | 1692 | 15 |
| Gulf Refining Co | Ferry Lake No. 226 | 16–20–16 | 2290 | 450 |
| **Claiborne Parish** | | | | |
| Gulf Refining Co | George West No. 17 | 20–21– 7 | 1483 | 10 |
| Triangle Drilling Co | Meadows No. 1 | 7–22–5W | 2126 | dry aband. |
| **Bossier Parish—Elm Grove** | | | | |
| Palmer Corp | Caplis No. 9 | 25–16–12 | 1555 | 50 |
| **Bossier Parish—Bellevue** | | | | |
| Gulf Refining Co | Bliss et al A-4 | 15–19–11 | 425 | 25 |
| Gulf Refining Co | Bliss A-7 | 15–19–11 | 416 | 10 |
| **Caddo Parish—Vivian** | | | | |
| Dixie Oil Co | Donovan No. 3 | 21–22–15 | 1045 | 20 |
| **DeSoto Parish—Naborton** | | | | |
| Texas Oil Co | Christine No. 31 | 6–12–11 | 1265 | 10 |
| **Waskom—Harrison County—Texas** | | | | |
| Industrial Gas Co | Barlow No. 2 R.W.Bedford HRS | | 990 | s.w. aband. |
| Tylong O. & G. Co | Timmons No.1 R.W.Bedford HRS | | 1895 | 25m. ft. gas |
| **Panola County—Texas** | | | | |
| J. C. McCormick | Griffin No.4 James Shadoins HRS | | 1030 | 5m. ft. gas |
| H. S. Morris | L.W.S.M.Co.No.8 Jordan HRS | | 2285 | 10m. ft. gas |
| **ARKANSAS** | | | | |
| **Nevada County** | | | | |
| Bemis et al | J. R. Ellis No. 2 | 2–14–21 | 1163 | 250 |
| Smitherman & McDonald | C. W. Waters No. 2 | 2–14–21 | 1145 | 250 |
| **Stephens** | | | | |
| Gossett et al | Thompson No. 1 | 22–15–19 | 1485 | s.w. aband. |
| Buffalo Oil Co | Morgan No. 4 | 22–15–19 | 1545 | 10m. ft. gas |
| Magnolia Pet. Co | Rhinehart No. 6 | 36–15–20 | 2198 | 15 |
| Magnolia Pet. Co | Rhinehart No. 7 | 36–15–20 | 2185 | 30 |
| **Smackover** | | | | |
| Humble O. & R. Co | F.A.& B.T.Laney No.5 | 32–15–15 | 2385 | 400 |
| Owenwood Oil Corp | Snyder No. 11 | 34–15–15 | 2365 | 200 |
| Houston Oil Co | Hinton No. 7 | 5–16–15 | 2645 | 40m. ft. gas |
| Howell & Knowles | Springer No. 1 | 36–17–16 | 2527 | 25m. ft. gas |
| W. R. Keever | Sanford No. 4 | 17–16–15 | 2470 | 500 |
| Ramage et al | Cook No. 3 | 16–16–15 | 2483 | 75 |
| Smitherman & McDonald | Holloway No. 1 | 6–16–16 | 2265 | 10 |
| Texas Oil Co | Alphin No. 9 | 3–16–15 | 2550 | 10 |
| Wingfield et al | Slaughter No. 1 | 9–17–16 | 2090 | 600 |

# Heavy Oil Through Cracking Will Yield Larger Part of Gasoline Supply

By Gustav Egloff
Universal Oil Products Co.

*Delivered Before Petroleum Division, A. I. M. E., New York, Feb. 15*

THE cracking process has modified our needs as to crude oil production. Instead of a production running into over a billion barrels of crude a year, our requirements call for less than five hundred million barrels for the year 1926, to supply the gasoline needs of over 22,000,000 automotive engines, when one takes into account the amount of heavy crude and fuel oil in storage.

The heavy crude oil-producing fields of major importance are the California, Smackover and Gulf Coastal. The production for 1926 of these fields with the storage of heavy crude and fuel oil will amount to over 338,000,000 barrels. This quantity of heavy oil can be converted into 169,000,000 barrels of gasoline by the Dubbs cracking process without the use of any pretreatment whatsoever, such as the use of topping stills or coking stills.

### California Asphaltic Crude Oils

The heavy crude oils of California can producing at the rate of 27,000 barrels per day (Dec. 31. 1925). These oils range in Baume gravity from 8° to approximately 20°. The production for 1926 of low gravity oil will be 108,000,000 barrels at the present rate.

The heavy crude oils of California can be cracked as an average into 50 per cent of gasoline.

California could add 54,000,000 barrels of gasoline to its supply by cracking the rated 108,000,000 barrels of heavy crude oil during 1926. In addition to the heavy crude oil current production, there is in storage in California over 81,000,000 barrels of heavy crude and fuel oil of less than 20° A. P. I. The stored 81,000,000 barrels of crude and fuel oil are available cracking stocks which could be converted into 40,500,000 barrels of gasoline.

Hence California, by installing adequate cracking facilities, could produce a total of 94,500,000 barrels of high anti-knock gasoline during 1926 by the conversion of the heavy crude production and stored heavy oils of 189,000,000 barrels.

### Smackover Heavy Crude Oil

One of the wonder oil fields of the United States is the Smackover Arkansas, which is still producing over 189,000 barrels per day, of which 163,000 barrels (Dec. 31, 1925) is heavy oil. This oil, of asphaltic characteristics, is not very satisfactory as a fuel oil due to its emulsified water, high sulphur content and other properties. The general inquiry when a new Smackover well was brought in, was, "What will they do with it after they get it?" One leading oil man stated that "Smackover heavy crude had everything in it, it shouldn't have for a refiner."

Yet, despite these pessimistic statements, Smackover heavy oil is being commercially cracked into over 50 per cent gasoline. The Smackover heavy crude oil production of 163,000 barrels daily can be converted into 81,500 barrels of gasoline per day by the cracking process.

In round numbers the Smackover heavy crude oil field is producing at the rate of 60,000,000 barrels a year, which can be converted into 30,000,000 barrels of high quality anti-knock gasoline.

There are over 30,000,000 barrels of Smackover crude oil in storage. The cracking of the stored Smackover oil would yield 45,000,000 barrels of gasoline

Hence the cracking of the stored Smackover oil and the 1926 production would yield 45,000,000 barrels of gasoline from a total of 90,000,000 barrels of Smackover cracking stock. The gasoline derived from cracking Smackover heavy oil is a particularly high grade anti-knock quality product and suitable for use in high compression motors.

The Gulf Coast crude oils are being produced at the rate of 93,000 barrels per day (Dec. 31, 1925) or at the yearly rate of 34,000,000 barrels of asphaltic oil suitable for cracking stock. The Gulf Coast crude oils of high asphaltic characteristics are readily converted into 50 per cent of gasoline by the cracking process. The conversion of 34,000,000 barrels of Gulf Coast crude would yield 17,000,000 barrels of anti-knock gasoline. There is in storage 25,000,000 barrels of Gulf Coast crude which is amenable to commercial cracking into 12,500,000 barrels of gasoline. During 1926 a total of 59,000,000 barrels of crude oil will be available and by cracking this amount of crude oil, 29,500,000 barrels of gasoline can be produced.

The potential gasoline supplies of the future lie in the heavy crude oils of not alone the United States but the oil fields of the world such as Mexico, Borneo and Venezuela.

### Process Is Flexible

The Dubbs process is so flexible that it converts any type oil without change of principles or equipment into gasoline. Commercial plants are in operation or under construction in Japan, Borneo, Java, Dutch West Indies, Australia,

## CRACKED DISTILLATE, RESIDUAL OIL AND COKE MODE OF OPERATION

Another flexible method for operating the Dubbs process is to produce cracked distillate while continuously withdrawing residual oil from the reaction chamber. This mode of operation is going on in a number of commercial plants. The following data covers several runs made in a plant operating on Kevin-Sunburst fuel oil. The yields of gasoline range between 59 and 61 per cent of the charging stock.

### KEVIN-SUNBURST FUEL OIL

Results cracking *FUEL OIL* in Unit having 10′ x 30′ Reaction Chamber and reflux pump.

| | | | |
|---|---|---|---|
| Pressure Lbs. | 190 | 200 | 200 |
| Days on Stream | 2.83 | 3.71 | 3.33 |
| Hours on Stream | 68 | 89 | 80 |
| **Charging Stock** | | **Fuel Oil** | |
| Be. Gravity | 26.5 | 26.5 | 27.2 |
| Total Bbls. Charged | 1869 | 2534 | 2191 |
| Bbls. per day on Stream | 660 | 683 | 657 |
| **Results of Cracking** | | | |
| Pressure Distillate, Total Bbls | 1493 | 2091 | 1806 |
| Be. Gravity | 50.0 | 49.5 | 49.0 |
| % of Raw Oil | 79.9 | 82.49 | 82.4 |
| Residuum and Coke, Total Bbls | 339 | 391 | 359 |
| % Raw Oil | 18.1 | 15.4 | 16.3 |
| Unc. Gas, Total Bbls | 37.4 | 52.1 | 26.6 |
| % Raw Oil | 2.0 | 2.06 | 1.21 |
| Coke, Tons Produced | 47.49 | 54.3 | 50.27 |
| Lbs. per Bbls. of Raw Oil | 61.0 | 42.9 | 45.9 |
| Fuel Consumption, Total Bbls | 57 | 48 | 59 |
| % Raw Oil | 3.0 | 1.9 | 2.7 |
| **Results Distilling P. D.** | | | |
| Gasoline, Total Bbls | 1107 | 1561 | 1307 |
| Bbls. per day on Stream | 391 | 421 | 392 |
| % Raw Oil | 59.25 | 61.6 | 59.66 |
| % Pres. Dist | 74.2 | 74.7 | 72.4 |
| I. B. P.—E. P | | 98–437 | 101–433 |
| Be. Gravity | 52.0 | 53.3 | 52.6 |
| **Gas Oil (P. D. Botts)** | | | |
| Total Bbls | 269 | 428 | 397 |
| % Raw Oil | 14.4 | 16.0 | 18.1 |
| % Pres. Dist | 18.0 | 20.4 | 22.0 |

## KENTUCKY FUEL OIL

In another plant operating on Kentucky fuel oil the yields of gasoline range between 58 and 61 per cent.

Summary of runs cracking KENTUCKY FUEL OIL in a unit equipped with 62 Tube Furnace, Reflux Pump, and 10′ x 15′ Reaction Chamber.

| | | | |
|---|---|---|---|
| Pressure Lbs. | 175 | 175 | 180 |
| Days on Stream | 1.83 | 2.31 | 2.15 |
| Hours to Stream | 6.50 | 4 | 5½ |
| Hours on Stream | 44 | 55½ | 51½ |
| Hours Cleaning | 12 | 14 | .... |
| Complete Cycle | 62.5 | 73½ | .... |
| **Charging Stock** | | **Kentucky Fuel** | |
| Be. Gravity | 24 | 27 | 26 |
| Total Bbls. Charged | 1503 | 2075 | 1945 |
| Bbls. per Day on Stream | 821 | 898 | 907 |
| **Results of Cracking** | | | |
| Pressure Distillate, Total Bbls | 1089 | 1457 | 1466 |
| Be. Gravity | 56.0 | 56.4 | 56.2 |
| % Raw Oil | 72.4 | 70.3 | 75.4 |
| Residuum, Total Bbls | 285 | 425 | 266 |
| % Raw Oil | 18.9 | 20.5 | 13.7 |
| Unc. Gas and Coke, Bbls | 129 | 193 | 213 |
| % Raw Oil | 8.6 | 9.3 | 10.9 |
| Coke, Tons Produced | .... | 30 | 31 |
| Lbs. per Bbls. Raw Oil | .... | 28.9 | 31.9 |
| **Results Distilling Pressure Distillate** | | | |
| Gasoline, Total Bbls | 879 | 1207 | 1192 |
| Bbls. per day on Stream | 480 | 522 | 554 |
| % Raw Oil | 58.5 | 58.2 | 61.2 |
| % Press. Dist | 80.7 | 82.9 | 81.2 |
| End Point | 435 | 435 | 435 |
| Be. Gr | 55.6 | 56.4 | 56.0 |

Note: All figures are based on charging stock being fed into the system only once and do not include any rerunning.

## Results on cracking California Gas and Fuel Oils in Unit having 10′ x 10′ reaction chamber and reflux pump.

| | | California Oils | | |
|---|---|---|---|---|
| | **Gas** | **Gas** | **Fuel** | **Fuel** |
| Pressure Lbs. | 200 | 200 | 150 | 150 |
| Days on Stream | 1.92 | 2.96 | 3.24 | 0.97 |
| Hours on Stream | 46 | 71.16 | 71.16 | 23.25 |
| **Charging Stock** | **Calif.** | **Gas Oil** | **Calif.** | **Fuel Oil** |
| Be. gravity | 25.6 | 25.5 | 17.7 | 17.7 |
| Total Bbls. Charged | 1322 | 2129 | 2209 | 599 |
| Bbls. Day on Stream | 688 | 718 | 682 | 618 |
| **Results of Cracking** | | | | |
| Pressure Distillate, Total Bbls | 908 | 1397 | 1145 | 393 |
| Be. Gravity | 52.1 | 53.9 | 53.7 | 51.7 |
| % Raw Oil | 68.7 | 65.58 | 51.83 | 65.5 |
| Residuum, Total Bbls | 275 | 365 | 776 | 67 |
| % Raw Oil | 20.8 | 17.14 | 35.13 | 11.2 |
| Unc. Gas and Coke, Bbls | 139 | 368 | 288 | 140 |
| % Raw Oil | 10.5 | 17.28 | 13.04 | 23.3 |
| Tons, Coke Produced | 20.92 | 32.65 | 33.63 | 23.11 |
| Lbs. per Bbl. of Raw Oil | 31.67 | 30.6 | 30.6 | 77.28 |
| **Fuel Consumption** | | | | |
| % Raw Oil | 4.39 | 2.3 | 4.26 | 5.7 |
| **Results Distilling P. D.** | | | | |
| Gasoline, Total Bbls | 762 | 1216 | 984 | 329 |
| Bbls. per Day on Stream | 397 | 411 | 295 | 339 |
| % Raw Oil | 57.7 | 57.07 | 44.59 | 54.8 |
| % Press. Dist | 84.0 | 87.0 | 86.0 | 83.6 |
| I. B. P.—E. P. | 94–435 | 94–435 | 96–437 | 102–439 |
| Be. Gravity | 53.5 | 54.9 | 53.8 | 54.0 |

Note: All figures are based on the charging stock being fed into the system only once and do not include any rerunning.

## VOLATILITY GASOLINE DIRECT FROM THE PROCESS

Summary of runs producing 437 End Point Distillate in a unit equipped with Reflux Pump and 10′ x 10′ Reaction Chamber.

| **Type Operation** | **Residuum** | **Residuum** | **Residuum** | **Non Residuum** |
|---|---|---|---|---|
| Pressure lbs. | 200 | 200 | 200 | 200 |
| Hours on Stream | 83 | 99 | 73 | 24 |
| Days on Stream | 3.46 | 4.12* | 3.04 | 1.00* |
| **Charging Stock** | | **MID-CONTINENT** | | |
| **Type** | **Gas Oil** | **Gas Oil** | **Topped Crude** | **Topped Crude** |
| Total Bbls. | 2836 | 3235 | 2448 | 405 |
| Bbls. per Day | 820 | 785 | 805 | 405 |
| Be. Gravity | 31.6 | 32.6 | 27.4 | 26.5 |
| **Results of Cracking 437 E. P. Gasoline** | | | | |
| Total Bbls. | 1755 | 2059 | 1301 | 319 |
| Bbls. per Day | 507 | 500 | 428 | 319 |
| % Raw Oil | 61.9 | 63.6 | 53.1 | 78.9 |
| Be. Gravity | 61.8 | 61.2 | 61.8 | 60.4 |
| **Residuum (Est)** | | | | |
| Total Bbls. | 962 | 1041 | 1040 | Non |
| Bbls. per Day | 278 | 253 | 342 | Residuum |
| % Raw Oil | 33.9 | 32.2 | 42.5 | |
| Be. Gravity | 19.2 | 19.3 | 18.0 | |
| **Unc. Gas and Coke (Est)** | | | | |
| Total Bbls. | 119 | 135 | 107 | 86 |
| Bbls. per Day | 35 | 32 | 35 | 86 |
| % Raw Oil | 4.2 | 4.2 | 4.4 | 21.1 |
| **Coke Produced** | | | | |
| Tons | 21.2 | 14.07 | 24.1 | 13.6 |
| **Fuel Consumption** | | | | |
| Liquid % Raw Oil | 4.77 | 4.18 | 5.70 | 6.05 |

*Run shortened to keep this unit on regular cleanout schedule.

All figures are based on charging stock being fed into the system only once and do not include any rerunning.

Roumania and many parts of the United States.

The operation of the process has a high degree of flexibility in that not alone does it convert any type of oil into commercial yields of gasoline, but the modes may differ as a function of market conditions.

The outstanding feature of the process is the simultaneous topping, coking and cracking of crude oils in one operation. This mode of operation eliminates the need of topping and coking stills in a refinery. The economic saving to the oil industry by the Dubbs process eliminating the topping and coking steps in a refinery would be of the order of millions of dollars yearly saving.

This mode of operation can be so controlled that just two commercial products may be produced from the process, that is, gasoline and coke, or the process may be controlled so as to produce pressure distillate, and coke, or pressure distillate, residual oil and coke, or gasoline, residual oil and coke. The above methods of operation of the process can be carried out in the same commercial installations without any changes whatsoever.

### Production of End Point Gasoline Direct

The production of volatility gasoline of proper initial and end boiling point is not a difficult matter. This has been accomplished commercially and yields of 53 to over 78 per cent gasoline have been obtained by cracking Mid-Continent gas and topped crude oil. The treatment of volatility gasoline to water white color with clays and earths is not a serious problem, however some volatility gasolines from the cracking of high sulphur and nitrogen oils are real treating problems.

Some cracked gasolines contain more than one half of one per cent of sulphur compounds. These have very bad odors and require some deodorizing. However, most Mid-Continent oils are relatively low in sulphur content and the volatility gasoline derived therefrom have fair odors which are readily improved without redistillation being necessary after slight treatments to commercal products.

It would be advisable to market the cracked gasoline wherever possible without any treatment after leaving the cracking process, for by subsequent treatment polymerization takes place, which means a loss of the most important anti-knock hydrocarbons in the pressure gasoline.

Data of typical commercial cracking runs are shown in accompanying tables, showing the yields of volatility gasoline direct from the cracking process ranging from 53 and 78 per cent, the latter being on the basis of non residuum mode of operation.

The commercial cracking of California gas and fuel oil is going on with yields of over 50 per cent gasoline with residual oil being drawn off continuously. The California oils contain relatively high percentages of nitrogen and sulphur compounds. The cracked distillate contains in some cases as high as one per cent sulphur which is quite difficult to

remove. Certain sulphur compounds are relatively simple to remove but others are highly resistant to most chemical reagents, but they can be removed yet at a relatively high cost compared to Mid-Continent oils.

The accompanying tabulations cover the commercial data pertaining to the cracking of California gas and fuel oil.

One of the most prolific fields in the United States is the Smackover heavy oil field. The daily production of Smackover heavy crude oil is 163,000 barrels. This heavy crude oil is a difficult oil to refine and is relatively highly corrosive. However, the topped crude is an excellent cracking stock producing not alone high yields of gasoline, but also a gasoline of superior anti-knock properties. Four typical commercial runs have been tabulated which show the percentage yields of gasoline between 48.9 and 52.1 per cent.

Another commercial plant using the Dubbs process and operating on Smackover heavy crude oil produces three products, gasoline, coke and fuel oil, the latter a much superior fuel over that of the crude oil used as cracking stock.

The greatest stumbling block in the development of the art of cracking was the problem of coke formation. Millions of dollars have been expended to overcome the problem of coke deposition on the heating element of the cracking still. A number of installations are in operation for the cracking of low coke forming oils and are strictly limited to selected cracking stocks. But the Dubbs process is not limited in any such manner. It is converting oils of low and high coke formation into high yields of gasoline. It is processing oils of less than 1 per cent to over 25 per cent by weight of the oil going to coke under the heat and pressure conditions of the system while producing yields of gasoline from 15 to over 78 per cent by volume of the oil being processed.

Comparison of various types of oils cracked in the Dubbs process together with gravity of raw oil, per cent gasoline derived therefrom, and amount of coke produced per barrel of raw oil processed is shown in the opposite table.

The conversion of heavy oils into gasoline produces a coke of high economic value. It is estimated that within 10 years' time that there will be over 10,000,000 tons of coke produced from the cracking reaction, and in briquette form will have an economic value of over $100,000,000 a year. It may well develop that coke produced from the cracking reaction in some instances will be the major product of the cracking reaction and gasoline the by-product.

During one form of operation of the process while producing cracked distillate no residual oil is drawn from the reaction chamber. This mode of procedure does away with the use of coking stills bringing about a huge economic saving in the refining industry, for it is well known that it is very costly to coke oil, hence with the simultaneous cracking and coking of heavy oils an-

## SMACKOVER TOPPED CRUDE

Results on Cracking *Heavy Smackover Topped Crude* in a unit Equipped with Reflux Pump and Single 10' x 30' Reaction Chamber.

| | | | | |
|---|---|---|---|---|
| Pressure Lbs. | 180 | 180 | 180 | 180 |
| Hours Fire to Stream | 7 | 6 | 6 | 6 |
| Hours on Stream | 61 | 73 | 56 | 79 |
| Hours Cleaning | 20 | 18 | 25 | |
| Complete Cycle | 88 | 97 | 87 | |
| **Charging Stock** | **Heavy Smackover Topped Crude** | | | |
| Be. Gravity | 18.0 | 17.8 | 17.9 | 17.9 |
| Total Bbls. by Gauge | 2129 | 2743 | 2095 | 2801 |
| Bbls. per day on Stream | 839 | 902 | 899 | 851 |
| **Results of Cracking** | | | | |
| Press. Dist. Total Bbls. | 1368 | 1679 | 1374 | 1838 |
| Be. Gravity | 15.7 | 51.2 | 52 | 51.8 |
| % Raw Oil | 64.3 | 61.2 | 65.6 | 65.6 |
| **Residuum** | | | | |
| Total Bbls. | 213 | 274 | 210 | 280 |
| % Raw Oil | 10.0 | 10.0 | 10.0 | 10.0 |
| **Unc. Gas and Coke** | | | | |
| Total Bbls. | 548 | 790 | 511 | 683 |
| % Raw Oil | 25.7 | 28.8 | 24.4 | 24.4 |
| **Coke** | | | | |
| Tons Produced | 45 | 61 | 50.5 | 65 |
| Lbs. per Bbl. of Raw Oil | 42.3 | 44.6 | 48.2 | 46.4 |
| **Fuel Consumption** | **Natural and Unc. Gas—Not measured** | | | |
| **Results Distilling P. D. Gasoline—430 Lab. Cut.** | | | | |
| Total Bbls. | 1109 | 1343 | 1075 | 1413 |
| Bbls. per day of Stream | 437 | 442 | 461 | 429 |
| % Raw Oil | 52.1 | 48.9 | 51.3 | 50.4 |
| % Press. Dist. | 81.0 | 79.9 | 78.3 | 76.9 |
| I. B. P.—E. P. | 106–435 | 106–436 | 104–436 | 104–436 |
| Be. Gravity | 53.1 | 53.0 | 53.6 | 53.5 |
| **Gas Oil (P. D. Bottoms)** | | | | |
| Total Bbls. | 176 | 243 | 223 | 328 |
| % Raw Oil | 8.3 | 8.9 | 10.7 | 11.7 |
| % Press Dist. | 12.9 | 14.5 | 16.2 | 17.8 |
| **Dist. Loss** | | | | |
| Total Bbls. | 83 | 94 | 76 | 97 |
| % Raw Oil | 3.9 | 3.4 | 3.6 | 3.5 |
| % Press. Dist. | 6.1 | 5.6 | 5.5 | 5.3 |

## CRUDE OILS

| | Baume Gravity | Per Cent N. E. P. Gasoline | Lbs. Coke Per Bbl. Raw Oil | Lbs. Coke Per Bbl. Gasoline | |
|---|---|---|---|---|---|
| Healdton Crude | 29.6 | 45.0 | 5.0 | 11.1 | |
| Tarakan Crude | 18.2 | 32.0 | 23.0 | 71.8 | |
| Panuco Crude | 12.6 | 24.0 | 15.0 | 62.4 | |
| | 12.6 | 28.0 | 29.0 | 103.5 | |
| | **Topped Crude** | | | | |
| Lewistown Montana Topped Crude | 38.0 | 48.0 | 5.0 | 10.4 | |
| Smackover Southfield Topped Crude | 27.1 | 56.4 | 18.65 | 33.1 | |
| | 25.5 | 54.0 | 18.8 | 34.8 | |
| | 27.5 | 49.0 | 19.9 | 40.7 | |
| Tonkawa and Burbank Topped Crude | 25.0 | 46.0 | 27.0 | 58.7 | |
| | 25.0 | 55.0 | 65.0 | 118.2 | Non |
| | 25.0 | 34.0 | 11.0 | 3.23 | Residual |
| | 25.0 | 36.0 | 10.0 | 27.8 | oil run |
| | 25.0 | 47.0 | 19.0 | 40.4 | |
| Robberson Topped Crude | 19.0 | 33.0 | 35.0 | 106.0 | |
| Heavy Smackover Topped Crude | 18.0 | 52.0 | 42.0 | 80.7 | |
| | 17.8 | 49.0 | 44.6 | 91.0 | |
| | 17.9 | 51.3 | 48.2 | 93.8 | |
| | 17.9 | 50.4 | 46.4 | 92.1 | |
| Louisiana Topped Crude | 29.0 | 41.0 | 16.0 | 39.0 | |
| Ranger Topped Crude | 26.0 | 41.0 | 14.0 | 34.1 | |
| Tonkawa Topped Crude | 28.0 | 66.5 | 63.6 | 95.7 | Non |
| | 28.0 | 65.8 | 60.6 | 92.0 | Residual |
| | 28.0 | 63.5 | 57.4 | 90.3 | oil run |
| | **Fuel Oils** | | | | |
| Kevin Sunburst Fuel | 27.0 | 61.6 | 42.9 | 69.7 | |
| Kentucky Fuel | 28.3 | 53.9 | 20.0 | 37.1 | |
| | 27.0 | 58.0 | 29.0 | 50.0 | |
| | 26.0 | 58.0 | 25.0 | 43.1 | |
| Luling Fuel | 23.4 | 47.18 | 14.0 | 29.7 | |
| Tonkawa and Burbank Fuel and Gas Oil | 27.0 | 48.5 | 17.0 | 35.0 | |
| North Texas Fuel | 25.0 | 40.0 | 34.0 | 85.0 | |
| Mid-Continent Fuel | 27.7 | 45.0 | 12.7 | 28.2 | |
| | 26.0 | 50.0 | 16.0 | 32.0 | |
| | 26.5 | 78.9 | 67.3 | 85.3 | Non |
| Venezuela Fuel | 13.4 | 23.0 | 17.0 | 73.8 | Residual |
| | 13.0 | 26.0 | 27.0 | 103.8 | oil run |
| Louisiana Fuel | 26.0 | 36.0 | 12.0 | 33.3 | |
| Indiana, Illinois, Kentucky Fuel | 23.0 | 33.0 | 13.0 | 39.4 | |
| Miri Fuel Oil | 19.0 | 26.0 | 16.0 | 61.5 | |
| | 19.0 | 27.0 | 16.0 | 59.2 | |
| California Long Beach Residue | 18.0 | 37.0 | 25.0 | 67.5 | |
| | 18.0 | 36.0 | 21.0 | 58.3 | |
| | 18.0 | 38.0 | 22.0 | 57.8 | |
| | 17.0 | 34.0 | 21.0 | 61.7 | |
| California Fuel Oil | 17.7 | 45.0 | 30.6 | 70.2 | |
| | 17.7 | 55.0 | 77.0 | 140.0 | |
| Venezuela Residue | 14.0 | 32.0 | 35.0 | 109.3 | |
| Panuco Residue | 9.7 | 21.0 | 20.0 | 95.2 | |
| | 9.7 | 18.0 | 17.0 | 94.4 | |
| | **Gas Oils** | | | | |
| California Gas Oil | 25.5 | 57.0 | 30.0 | 52.7 | |
| Pennsylvania Gas Oil | 38.4 | 43.2 | 2.0 | 4.62 | |
| Robberson Gas Oil | 33.0 | 43.0 | 6.3 | 14.65 | |
| Mid-Continent Gas Oil | 34.0 | 40.0 | 1.3 | 3.25 | |
| | 32.0 | 76.0 | 5.4 | 7.1 | Non |
| Venezuela Gas Oil | 27.0 | 35.0 | 9.1 | 26.0 | Residual |
| | 25.0 | 42.0 | 22.0 | 52.3 | oil run |
| Mexican Gas Oil | 21.0 | 41.0 | 18.0 | 43.8 | |
| Mexican Distillate | 26.0 | 39.0 | 10.0 | 25.6 | |

## NON RESIDUAL OIL RUNS

Plant equipped with 60 tube furnace Hot Oil Reflux Pump 10' x 10' Reaction Chamber.

| | | | | | | |
|---|---|---|---|---|---|---|
| Run No. | 48 | 49 | 50 | 51 | 52 | 53 |
| Pressure | 170 | 165 | 165 | 175 | 185 | 185 |
| **Type Feed** | | | OVERHEAD | | | |
| **% Overhead** | | | 100% | | | |
| Hours on stream | 35 | 43 | 45 | 41 | 37 | 33 |
| Days on Stream | 1.46 | 1.79 | 1.875 | 1.71 | 1.54 | 1.37 |
| **Charging Stock** | | | TONKAWA TOPPED CRUDE | | | |
| Be. Gravity | 28.7 | 28.6 | 29.2 | 28.0 | 27.9 | 28.1 |
| Avg. % of 572° F. Engler | 25.5 | 26.7 | 26.3 | 26.1 | 25.6 | 26.3 |
| Total Bbls | 731 | 881 | 928 | 872 | 804 | 712 |
| Bbls. per day | 501 | 492 | 495 | 510 | 522 | 520 |
| **Press. Dist. Produced** | | | | | | |
| Total Bbls | 637 | 766 | 795 | 776 | 722 | 637 |
| % of Raw Oil | 87.2 | 86.9 | 85.6 | 88.9 | 89.8 | 89.4 |
| Bbls. per day | 436 | 428 | 424 | 454 | 469 | 465 |
| Be. Gravity | 54.3 | 52.0 | 53.1 | 53.6 | 54.0 | 53.5 |
| **Navy Init. End Point Gasoline** | | | | | | |
| Total Bbls | 464 | 511 | 548 | 574 | 535 | 470 |
| % of Press. Dist | 72.8 | 66.8 | 68.9 | 74.0 | 74.1 | 73.7 |
| % of Raw Oil | 63.5 | 58.1 | 59.0 | 65.8 | 66.5 | 66.0 |
| Bbls. per day | 318 | 286 | 292 | 336 | 347 | 343 |
| **Coke** | | | | | | |
| Tons | 21.0 | 24.0 | 26.5 | 26.4 | 25.6 | 19.65 |
| Lbs. per Bbls. R. O. | 57.4 | 54.4 | 57.1 | 60.6 | 63.6 | 55.0 |
| **Fuel** | | | | | | |
| Liquid, Total | 6.34 | 5.83 | 2.28 | 3.35 | 6.13 | 4.84 |
| On str. to Fires out | 3.73 | 3.97 | 2.0 | 2.68 | 4.11 | 3.04 |
| Gas—Avg. Cu. Ft. per Hour | 9772 | 7969 | 9729 | 10312 | 10342 | 10456 |
| No. Hours Burned | 35 | 43 | 45 | 41 | 37 | 33 |

other important development has taken place in the refining industry. The cracking and coking mode of operation requires no installation changes in the process, but just a slight change in the operating conditions.

Some commercial runs have just been made in a California plant which is cracking heavy oils on a non-residual oil procedure and the yield of gasoline is over 60 per cent.

The yields of Navy end point gasoline of seven typical commercial runs operating Tonkawa topped crude oil ranged between 58 and 66 per cent of the oil undergoing heat and pressure treatment is shown in a table on a preceding page.

Another table covers the details of commercial results in a refinery using non-residual oil type of operation.

The raw charging stock to be converted into gasoline and coke is pumped to the dephlegmator or directed to the heat-element set within a furnace, or it may be diverted in part to the dephlegmator and part of the heating element as control conditions require.

The raw oil passes through the continuous heating tube wherein it is raised to a temperature approximately 820° F. to 900° F. under a pressure of upwards of 200 pounds to the square inch.

The heated oil under heat and pressure passes into the expansion chamber and as a function of the temperature is vaporized therein with a deposition of coke within said expansion chamber. The vapors pass out of the expansion chamber through a pipe connection to the bottom of the dephlegmator wherein the heavier portions are condensed to a liquid while heat interchanged with the raw charging stock, being pumped into the dephlegmator.

The mixture of raw charging stock and reflux condensate oil passes downwardly to the suction side of a hot oil pump, and then pumped through the heating tubes. The oil is raised to the cracking temperature under the pressure condition prevailing therein.

The uncondensed vapors in the dephlegmator pass out through the top and via a pipe connection to a water condenser coil and as a liquid collected in a receiver and continuously passed to a gas separator. The liquid from the gas separator is continuously passed to a storage tank. The pressure on the system is controlled by means of a gas release valve on the receiver. The excess gas over that necessary to control the pressure on the system is passed either through a scrubber with the gas dissolved in the pressure distillate or passes to a gas holder or is burned directly in the furnace of the cracking unit or in other parts of the refinery.

The temperature control of the dephlegmator is of such a character that volatility gasoline may be produced continuously. When a pressure distillate oil is desired having a higher end point than volatility gasoline the temperature control on top of the dephlegmator may be adjusted to that end.

When the operation desired is the production of a residual oil the control valve in the bottom of the chamber is opened so that residual oil passes continuously to a storage tank. However, when volatility gasoline and coke method is desired the residual draw-off valve at the bottom of the expansion chamber is closed and a slightly higher temperature is carried on the transfer liquid. This brings about a condition in which cracked vapor and coke are produced instead of cracked vapors, residual oil and coke.

### Pollution Bill In Congress

Staff Special

TULSA, Feb. 25.—Severe penalties would be assessed on oil operators of United States who might permit oil or salt water to escape into streams, under terms of a bill now before the committee on rivers and harbors of the house of representatives. A copy of the bill is being circulated to the producing industry in the current bulletin of the Mid-Continent Oil & Gas Association.

While the bill refers to navigable streams it includes a definition which includes any stream which is the tributary of a navigable stream, thus making it apply to virtually every creek in the country. Penalties for violation of the law run as high as a fine of $2500 or a year's imprisonment, each day of violation being considered a separate offense.

Similar bills have been introduced in the last three sessions of congress. The present one is H. R. 5382, introduced by Representative Wilson of Louisiana. It is said to have been inspired by the unfortunate conditions in the Smackover field.

## William Kennedy. Pioneer Texas Geologist, Dead

Staff Special

HOUSTON, Feb. 27.—Burial services for William Kennedy, pioneer geologist of the southwest, were held yesterday at Austin. Mr. Kennedy was 67 years old and at the time of his death in Fort Worth, Feb. 22, was consulting geologist for the S. M. Swenson interests, the Freeport Sulphur Co., of New York. He never recovered from an attack of influenza which fastened on him about two months ago.

Mr. Kennedy was for years chief geologist of the Lone Star Gas Co., and had acted for the Magnolia Petroleum Co. at such times as they used geological data. He was internationally known for his work in Texas and Arkansas and ranked as an authority on Tertiary formations.

Besides the American Association of Petroleum Geologists, Mr. Kennedy held memberships in the old Texas Academy of Science, the American Institute of Mining and Metallurgical Engineers and the American Petroleum Institute.

Born in Scotland and educated at Edinburgh University, Mr. Kennedy emigrated to North America in early life. He first went to Hamilton, Ontario, later was with the Arkansas Geological Survey in 1888 and then joined the Texas survey in 1890.

Mr. Kennedy is survived by his wife, Mrs. Margaret S. Kennedy.

WOOSTER, O.—The Liberty-Bell Service Station, which was opened here on July 4, 1925 by H. S. Palmer, has enjoyed good business with Sinclair Refining Co.'s products. The station is located at the corner of Liberty St. and Bell Ave., whence it gets its appropriate name and a large bell on the corner of the lot helps to carry out the idea. The station lot is at the corner of Lincoln Highway, the Three C's and Harding Ave. It is equipped with four visible pumps and drain rack.

# Centrifugal Dewaxing of Petroleum Oils For Lubricant Production

By Max B. Miller
Max B. Miller & Co. Inc.

*Delivered Before Petroleum Division, A. I. M. E., New York, Feb. 15-17.*

MOST of the discussions relating to the centrifugal removal of wax from petroleum products have been centered upon the results obtained. Little has been said regarding the means by which the end was gained. A few words, therefore, concerning the type of the centrifuge, the manner of its operation which in reality represents the starting point from which the process as a whole was developed should be of interest.

There are two salient features to the centrifuge utilized in connection with dewaxing. They are the intensity of the separating force developed by the machine and its ability to continuously discharge separated solids.

The centrifuge is not of the hydro-extractor type in which the solids are retained in a rotor while the liquid is discharged through openings in the periphery. It does not employ a filter medium. It depends upon the subsidence of the various constituents of any mixture in order to effect their separation. The action, therefore, within the rotor of this centrifuge is exactly the same as the action within a settling basin.

### Intensity of Centrifugal Force

The difference between the two methods lies in the intensity of the force utilized. The centrifuge operates at a speed of 15,000 r.p.m. and develops a calculated centrifugal force which is 13,000 times as great as the force of gravity, the only force which is available in the case of a settling basin.

In other words, the specific gravity of each constituent of any mixture within the rotor of the operating centrifuge is increased 13,000-fold and consequently the difference in the specific gravity of each is increased by a like amount. It can, therefore, be said, theoretically at least, that either in the matter of time or the completeness of the separation that the centrifuge is 13,000 times as effective as is the case where gravity is depended upon.

### Continuous Discharge of Solids

The problem of centrifugal dewaxing is one involving the separation of a suspended solid—the wax, from a liquid—the dilute lubricating oil. Because the solid content of the mixture will vary according to the character of the stock being treated from 10 to 25 per cent and the material fed to the machine it also involves not only the continuous separation of both constituents but in addition the continuous discharge of both solid and liquid.

Up until the present Sharples dewaxing centrifuge had been developed, the continuous discharge of separated solids from a centrifuge had not been accomplished. It was the development of the solid discharge feature of the Sharples centrifuge which has made the centrifugal dewaxing of petroleum products a commercial success.

### Description of Process

The steps of the process employing centrifugal dewaxing may be briefly described as follows:

The stocks to be treated with, diluted with naphtha. The naphtha-diluted oil is then chilled through a period of 48 hours as a means of solidifying the wax. The temperature of the oil is reduced to a temperature varying from 10° F. above zero down to as low as 10° below.

The lower the oil is chilled the more wax will be solidified and the lower the pour point of the finished product. When the mixture has been chilled to centrifuging temperature it is pumped through a battery of centrifuges where the wax is separated from it.

The naphtha is then removed from the dilute, dewaxed oil by distillation. In most cases the stock is filtered to color prior to dewaxing. In some cases the filtering operation is carried on after dewaxing. The procedure here varies with the character of the stock and with the requirements for the finished product.

### Applications of Process

In its original conception the Sharples process was developed for the purpose of replacing cold settling plants in connection with bright stock manufacture. Since its development for that purpose its scope has been broadened until today it is also suitable for both the dewaxing of long residuums and of overhead distillates produced as the result of running crude to flux.

Inasmuch as the advantages of the process when compared with older methods are different in each of the aforementioned uses to which it may be put, each of them will be discussed separately.

### Bright Stock Production

The advantages of producing bright stock by means of the Sharples process in comparison with the cold settling method are entirely due to the ability of the Sharples centrifuge to effect a more complete separation than is possible in any other way. It leaves less oil mechanically entrained in the wax residue. It leaves less suspended wax in the separated oil.

### Yield

The process consequently reduces the yield of petrolatum—a product of low value and correspondingly increases the yield of bright stock—a product of high value. Hence, by being able to produce centrifugally more bright stock and less petrolatum from a given amount of raw material as compared with cold settling operations, the increase in yield does not have to be very great in percentages to account for an enormous increase in profits.

### Low Cold Test

As a result of the ability of the process to more completely separate the solidified wax from the oil the pour point of the oils which have been Sharples-processed will run as low as 15° F. or from 25° to 30° lower than the stocks produced by cold settling. These oils not only, therefore, have a wider range of use but because they are freer from petrolatum—a product of no lubricating value, at the higher temperatures they are also purer.

### Dewaxing of Long Residuums

Shortly after the Sharples process was commercially established for the manufacture of bright stock it was developed so that it could be utilized for the dewaxing of residuums which contained not only steam refined stocks which are used for producing bright stock but also that fraction of the crude which is ordinarily taken overhead as a heavy wax distillate and is subsequently pressed for neutral production.

Such residuums constitute the major portion, if not all, of that fraction of the crude which is suitable for lubricant production. They have become known as long residuums. In considering this application it should be remembered that prior to the development of the centrifugal process all bright stocks were manufactured by cold settling. All neutrals from paraffine bearing crudes were manufactured by pressing. In most cases neither of the resulting products was suitable for use. The viscosity of the neutral was too low. The viscosity of the bright stock was too high.

Usable lubricants could be produced only by blending bright stocks and neutrals in a variety of proportions to meet various specifications. The production, therefore, of both bright stock and neutrals was not because of the desirability of the products but because of the limi-

tations of the methods utilized for their manufacture.

The centrifugal process is without limitation in this respect. It may be used for the dewaxing of the longest residuum—a residuum representing the entire lubricant cut of the crude or for the manufacture of the heaviest bright stock. It permits the refiner to reduce the crude in its initial distillation to a variety of specifications according to his requirements, to dewax the residuum in a single operation and to produce as a result a low pour point stock with which several things may be done.

In most instances it may be used straight as produced without subsequent fractionation or blending. Where heavier oils are required it may be reduced to a bottom meeting a heavy oil specification producing as an overhead an excellent line of neutrals. Where lighter oils are required it may be utilized as a base for blending instead of bright stock.

### Increase in Yield

The use of the centrifugal process for the dewaxing of long residuum will increase the yield of finished lubricating oil above that procured from the same amount of raw material when treated by the older methods. The reasons for the increase in the yield of the bright stock fraction of the residuum have been given above and apply in the the same manner as in the case where the steam refined stock is dewaxed separately. The reasons for the increase in the yield of the neutral fraction of the residuum follow.

Where a distillate is pressed for neutral production it is necessary that its wax content be sufficiently crystalline after subsequent chilling to permit pressing. For the sole purpose of crystalizing the wax the distillate is at some time subjected to excessive heat treatment. It is this excessive heat treatment which not only breaks down the wax, but in addition breaks down the oil so that a large percentage of the distillate is produced as a gas oil or non-viscous neutral instead of the lubricant for which it was intended.

The centrifugal process does not depend on the crystallinity of the wax for its effectiveness. In fact, the more plastic or amorphous the nature of the wax the more effective the centrifugal process. The virtue of the centrifugal process in this particular application, therefore, lies in the fact that it will separate the wax without the necessity of subjecting the oil to a cracking distillation as a primary measure to wax removal. In other words, it allows the refiner to separate the wax from the oil without disturbing any of its natural lubricating characteristics. It can generally be said that the neutral yield from a given amount of residuum will be increased from 50 to 100 per cent.

### Dewaxing of Overhead Amorphous Distillates

During the past year the centrifugal process has been made suitable for the dewaxing of overhead stocks produced as a result of running crude to flux. The purpose of the process in connection with this application is to produce a full line of lubricating oils from crudes which contain such a large percentage of asphaltic material as to preclude the possibility of handling their lubricating values in the form of long residuum on account of the extreme losses which would be encountered as a result of the acid treatment for asphalt removal.

Lubricating stocks of this character are taken overhead prior to dewaxing as a means of concentrating the asphaltic matter in the form of a still residue.

In the preparation of such stocks for Sharples processing, the distillation of the crude is carried on in such a way as to bring the entire lubricant value of the crude overhead in a single cut. The stock is so run as to produce an overhead product containing waxes which are wholly amorphous. The Sharples process does not operate satisfactorily on stocks containing crystalline wax. A satisfactory distillation can with ordinary care be accomplished with fire and steam, with pipe stills or by high vacuum.

Overhead products of this character have become known as amorphous distillates. They are dewaxed just as produced without prior acid treatment or filtration. The dewaxing operation is carried on as in the case of long residuum or steam refined stock.

The resulting oil is of low pour point and as a rule has characteristics which are similar to those of the longer residuums. The finished oil may be subsequently fractionated by distillation into oils meeting a variety of specifications.

The principal advantage of applying the process to the dewaxing of overhead distillates is due to the increase in yield of lubricating oil by virtue of the fact that it eliminates the necessity of a rerunning or cracking distillation as a preliminary measure to wax removal. This permits an increase in yield as explained heretofore in connection with the yield of neutrals wherein a long residuum is dewaxed.

### Plant Flexibility

One of the principal advantages of the Sharples process is its flexibility. In a cold settling plant the equipment is suitable for bright stock manufacture and for nothing else. In a wax plant the equipment is suitable for the removal of crystalline wax and for nothing else. In the case of the Sharples process, however, the same plant without alteration can be utilized for any of the purposes heretofore mentioned. It, therefore, permits the refiner to meet ever-shifting conditions whether they may be due to the character of his crude supply or the requirements of a changing market.

## More Q. D. A. Hearings In Wisconsin

MADISON, WIS., Feb. 27.—The state of Wisconsin, through its department of markets, will resume its investigation of the Standard Oil Co.'s quantity discount agreements on March 17. It is reported that Standard Oil Co. of Indiana wishes to put in another day of testimony, and state officials say they too have a little more evidence to write into the record.

The account of the progress of the investigation and an explanation of its purpose, appeared on page 45 of the Feb. 17 issue of National Petroleum News. Four hearings in the investigation already have been held, Feb. 8, 9, 10 and 11 at Madison, Eau Claire, Appleton and Milwaukee respectively. The next hearing and probably all subsequent hearings if any will be held in Madison, the capital.

The department of markets contemplates issuing a ruling against the use of the Q. D. A. in Wisconsin. The investigation is to assemble facts upon which to base such a ruling. Commissioner Edward Nordman presides over the hearings. Attorney General Herman Ekern questions witnesses. After the hearing in Milwaukee on Feb. 11, Mr. Ekern asked for a postponement of other hearings and the Standard Oil Co. agreed.

### Pioneer Compounder Dies

BUFFALO, Feb. 27.—The recent death of N. B. Fails, president of the N. B. Fails Lubricating Co., Buffalo, marks the passing of another old timer in the industry. Mr. Fails had been in the oil business since 1880 and was for 25 years with the Brooks Oil Co., Cleveland, O., according to A. M. Ward, general manager of the latter.

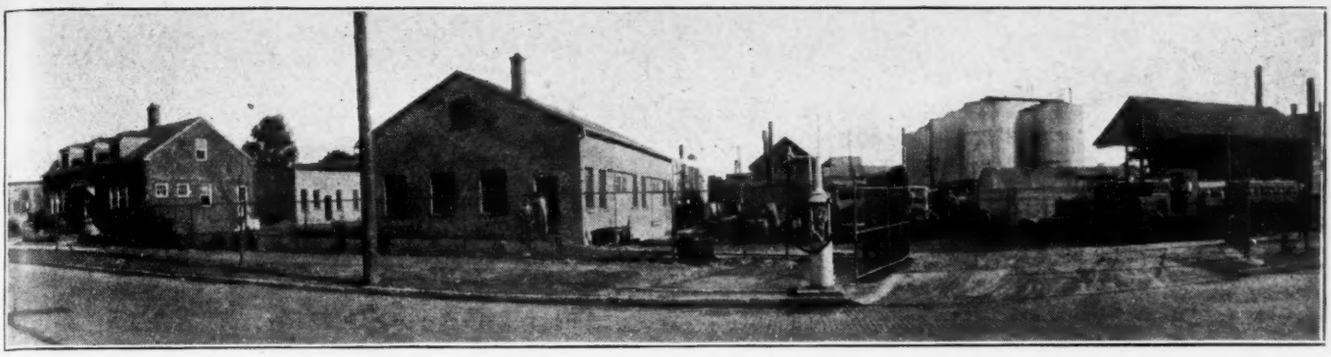
About 15 years ago he organized the company that bears his name, to do a general jobbing, marketing and compounding business in lubricating oils, greases and soaps. This company is affiliated with the Brooks company.

Mr. Fails was born at Bedford, O., 68 years ago. He is survived by his wife. Burial was at Buffalo.

SEATTLE, WASH.—The Union Oil Co. of California, Seattle district, has added four new White trucks to its equipment at various points in the district.

Expansion of trade is contemplated this year by the company in this district due to the number of new stations that have been added on the waterfront.

YAKIMA, WASH.—The Paramount Oil Co., Inc., recently added a new Dodge-Graham truck to its delivery equipment, which will make it possible to render better service to the ranch trade, according to E. A. Quist, vice president.



*Bulk plant of Central Ohio Oil Co. at Columbus. At left is the office, with garage in rear. To left of center is warehouse with lubricating oil and three 50,000-gallon gasoline tanks in rear. In center is boiler room, pumphouse and, in rear, old stable for storing drums. Right of center is battery of gasoline and burning oil tanks. At extreme right is two-truck loading rack.*

# Attractive, Bulk Station is Firesafe

By Roger B. Stafford
N. P. N. Staff Writer

COLUMBUS, O., March 1

AFTER fire destroyed a part of the bulk storage plant of the Central Ohio Oil Co. at Columbus last year, it was decided to rebuild along the best fire safe methods and at the same time make the plant attractive. All material except the sheathing to which the shingles are nailed, is either brick, concrete or steel. The sheathing is wood.

The office is in a tapestry brick, colonial cottage type building. There is a steam heated brick garage, with space for 10 trucks. Grease and package oils are stored in a brick and concrete warehouse. Part of the lubricating oils are kept in a long low structure which has two 32,000-gallon rectangular tanks, each of which is divided into four 8,000-gallon compartments. Empty drums are stored in an old stable at the rear of the plant lot, which escaped destruction in the fire.

### Tankage for 454,000 Gallons

The plant has tankage for 454,000 gallons of oils of all descriptions except heavy fuel. There are three 50,000-gallon vertical tanks for gasoline. These are surrounded by a concrete dike. There are five outdoor horizontal lubricating oil tanks, and a battery of 10 16,000-gallon vertical tanks six used for gasoline, one for kerosene, one for cleaners' naphtha, one for gas oil and one for distillate.

Concrete dikes have been built around both the battery of five lube tanks and the battery of 10 gasoline and burning oil tanks to preclude public fear although dikes are now regarded as unnecessary except around crude oil tanks. The plant is between an industrial district and the northwest Columbus residential area.

A feature of the plant is the pumping system. A one-story brick building houses six electrically driven Blackmer rotary pumps. The layout is so manifolded that pumping is done from tank cars to tanks or loading racks, or from tanks to loading racks, or from tanks to tanks. A vapor proof switchboard is outside the pumphouse and all wires are in vapor proof conduits.

Pumping to the loading rack, which is 60 to 75 feet from the pumphouse, is controlled from a switchboard at the rack. This switchboard is provided with a series of buttons, one for each product handled at the loading rack. When motor gasoline is wanted, for example, the motor gasoline button is pressed and pump on the motor gasoline line starts. By simply pressing another button the truck driver may shut off the current at any time.

### Accommodates Two Trucks

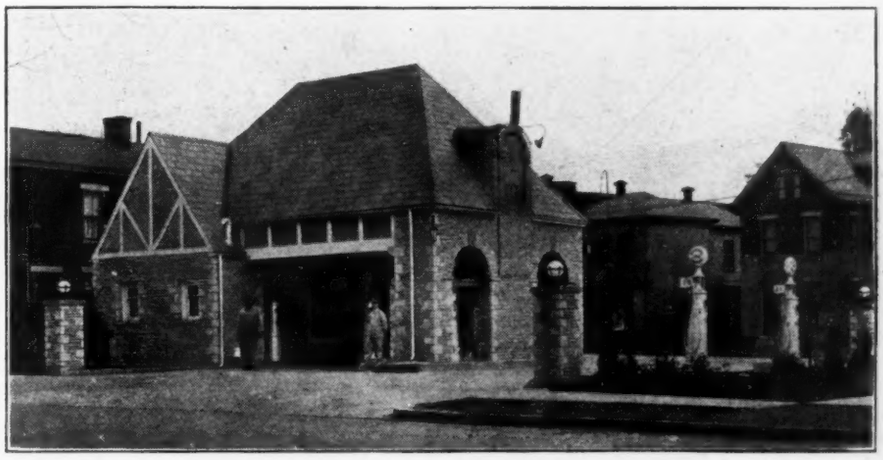
The loading rack has accommodation for two trucks at a time. It is under a steel roof but has a wall on only one side along a railroad track. Two railroad spurs run into the plant and eight to 10 cars may be handled at one time.

The Central Ohio company was incorporated in 1921 but the business had been established long before that. Its president is George J. Karb, for many years mayor of Columbus and president of the Ohio Petroleum Marketers' Association for three terms. Harvey Cashatt is vice-president, treasurer and general manager. C. A. Wagner is secretary.

### Builds Pretty Stations

The company is one of the larger Independent distributors in Columbus and owns a chain of service stations all on company-owned land. In residential districts the stations are built of rough limestone and many different designs are used. They are architectural gems and rival in beauty the best homes in the district. Many places they are the prettiest buildings in a neighborhood. In business districts where the value of the land may become so great that it would be unprofitable to continue a service station on the ground, less expensive and less permanent buildings are erected although some of these are attractively designed in stucco or brick.

The chain of more than two dozen stations are served by a fleet of eight trucks, two of which are stake and the remainder tank. Three grades of gasoline are handled, the motor grade which sells at the posted service station price, high test which brings a 4-cent premium, and aviation which brings a 7-cent premium. A large number of dealers also are served.



*Cottage type stone service station of Central Ohio Oil Co. at Columbus. Other stations of this company, also built of limestone but of different design are equally attractive.*

# Cheap Fare Exponent Offers Plan To Limit Ohio Gasoline Tax

Staff Special

CLEVELAND, March 1

PETER WITT, disciple of Tom L. Johnson in his fight for 3-cent street car fare in Cleveland, former city clerk and traction commissioner, and now a dramatic and stormy member of the Cleveland city council proposes an amendment to the Ohio constitution which would so hamstring the legislature that it could not increase the excise tax on gasoline above the present 2 cents per gallon. He also would limit the cost of license plates to $1 a pair and exempt automobiles from personal property taxation.

To submit a limiting amendment to the voters of Ohio at the election next November, 250,000 signatures to initiating petitions must be obtained in 44 of the 88 counties in this state. To assist in this task, Mr. Witt has organized the Automobile Owners' Protective League which any car owner may join upon payment of $1.

### Asks Oil Company Aid

Mr. Witt said he would call upon oil companies maintaining service stations in the state, "who," he said emphatically, "ought to be willing at least to contribute their effort." If oil companies favor the plan of limiting the present gasoline tax, attendants at their stations will be asked to have their customers sign petitions.

The $1 will go into the fund for purposes of "carrying on." Some interest and co-operation has already been manifested by auto owners, judging from the 300 replies in the form of $1 bills which have come in response to the 1500 letters sent out by Mr. Witt, calling attention to the plan.

The fear that Ohio will follow Kentucky and South Carolina which now have 5 cents per gallon road taxes, is expressed by Mr. Witt "unless something is done to prevent greedy politicians from plucking easy money from the motoring public."

### Facts Collected

To uphold his claims of unnecessary and excessive taxation, some startling facts and figures have been collected by Mr. Witt. In 1902, when he became city clerk of Cleveland, there were fewer than 500 automobiles in the city to worry the local traffic cops. License plates at that time were issued for purposes of identification only, at $1 each, which is 10 times the value of the plate, he said. The worries of the 1902 motorist were limited to the initial cost of the car, the $1 license fee, and the fear of frightening a neighboring horse in the Sunday morning church parade. Annual stampedes and long vigils at tag windows were then unheard of.

When the state took over the business of issuing license tags in 1908, it immediately began to use licensing as a source of revenue. In 1910 the price for a tag had been raised to $5, and during that year $245,752 was paid by auto owners of Ohio for tags. In 1915, license fees totaled $984,606; in 1920 they amounted to $5,877,614; in 1925, $13,500,000. Between April and December, 1925, some $9,000,000 went into the state treasury via the gasoline road tax. Automobiles in 1908 had increased to 4,000 in Cleveland and today there are about 200,000.

Figures show that in 1925, each auto owner, including truck owners, paid an average of $18 per car in taxes, not including the federal sales tax on accessories. This is 18 times larger than the 1908 tax.

It was only to "fool the motorist" when the license plate fee was cut in half last winter by the Ohio legislature, Mr. Witt asserted, when immediately the legislature substituted the 2-cent tax on gasoline. This resulted in producing more revenue for the state "with less squawking on the part of the public," Mr. Witt said.

Large white cardboard signs, lettered in blue, giving some of the facts and figures as mentioned herein on the past and present automobile taxes in Ohio, have been printed. These Mr. Witt expects to distribute to service stations in Ohio for display. The station attendant would be authorized to collect the $1 membership fee for the protective league from any one who should wish to contribute. A membership card would then be presented to the motorist, as proof of his support of the plan.

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CHICAGO, Feb. 25.—The business of the Sterling Refining Co., Chicago, operated by W. S. White, an old refinery and marketing man, has been consolidated with the Cities Service Oil Co. The Sterling's general offices and plant have been at 2101-13 Elston Avenue. The merging was effective February 1st.

OIL COMPANIES
MOTORISTS
HE'S DOING A FINE JOB OF COLLECTING AND IT HARDLY COST US A PENNY
BY GOLLY, I WONDER IF WE COULDN'T FIX SOME OTHER TAX FOR HIM TO COLLECT IN HIS SPARE TIME?
STATE
POLITICIAN
GAS TAX
STERLING

LOOKS AS IF THE JOB HAD A FUTURE

# The Editor's Viewpoint

National Petroleum News

## High Cost of Government

THAT few people realize the high cost of government these days is warrant enough for the oil industry challenging all increases, at least, in present gasoline taxes. Even though the individual oil man may be in favor of a gasoline tax to build more hard roads, he may very properly make the challenge on the ground that the public—not just the alleged tax payers,—should know what it is paying for government and should have that cost so clearly called to its attention that it will have a full realization of that cost in approving, or disapproving, any further tax on gasoline.

A recent report of the National Industrial Conference Board shows that, if the payroll of government, city, county, state and national,—were distributed equally among all persons gainfully employed,—it would amount to $125 a year each. While every one making less than one or two thousand dollars a year is not paying out this exact amount each year to maintain government payroll,—nevertheless each of those persons is paying a far larger portion of this $125 than he has any idea of.

The money may be collected from those seemingly well able to pay it, but the fact remains that these persons must get it from somewhere. They collect it in turn on every product they manufacture, or every service they perform, so that eventually it also comes out of the money which is paid those earning $1,000 a year or less. If every workman would appreciate this, there would be such a roar of protest that our government efficiency would have to go to a much higher level.

We all want good roads, fine parks, and all the other comforts of modern government but undoubtedly few of us realize what we pay for them, and few indeed, understand that we are mortgaging our future and paying good interest charges, to get these things. A keener realization of the cost might cause us to do without some of these things until we are better able to pay for them.

Good roads are one of the greatest assets of our present civilization but there is such a thing as paying too much for that asset.

The policy of most oil companies of stating that gasoline tax separate from the price of the gasoline, is a step in the right direction.—W. C. P.

## Oil Reserve for Defense

THE federal government should at once accumulate in above ground storage at least 100,000,000 barrels of oil for the navy, and hold it as a permanent reserve.

That suggestion was made by two men of rather widely different views at the Federal Oil Conservation Board's hearing at Washington recently. It probably has been overlooked by many readers in all the mass of data presented at the hearing.

The proponents of the idea were J. Edgar Pew, former president of the American Petroleum Institute, and Mark L. Requa, of California, head of the government's oil division during the late war.

The thought is not new. With the present rapidly increasing efficiency of cracking processes, which tends to reduce the quantity and bid up the price for fuel oil, the government could well study it at the present time since a good portion of any reserve would be fuel oil. A few years ago, when it was discussed, there was much fuel oil and practically no cracking processes.

One possible hazard to the industry should the government so decide, and it become known, would be a tendency towards increasing prices, which would undoubtedly draw criticism to the industry, despite it would be the natural working of the law of supply and demand. Perhaps it would be best for all if the government, should it adopt the policy, keep it a secret and accumulate the stock of oil slowly and from many sources—W.C.P.

## A Hopeful Sign

ANYONE who follows proceedings at meetings of the various oil associations must have been impressed with the increased amount of discussions by members of the industry that go on at those meetings, as compared with association gatherings even two or three years ago. Again, these present discussions at meetings are to the point, directed at specific current problems the various branches of the oil industry are concerned with and not general bombast, which more or less featured such meetings in the past.

An increasing proportion of the addresses at association gatherings and informal discussions as well, is directed at technical problems confronting the industry, in the production, refining and natural gasoline manufacturing branches, particularly. This is one of the most hopeful signs of the times. It shows the industry as a whole is awake to the fact it is entering a stage of development along the line of technical improvements in its manner of conducting its various operations.

It is not only the engineers and chemists in the industry that take part in these technical discussions. More and more you find the business executives in attendance, listening to papers and asking intelligent questions that show they are thinking along the same line.

This general interest is going a long ways towards stimulating the effort of the industry to solve these present technical problems, to bring the improvements in drilling and operating methods and in refining and natural gasoline manufacturing processes, that the industry has sensed must come some time in the future.

It has been said the stage has been set for the technical man in the oil industry today, and that the opportunities offered him are greater than ever before. More than that, however, there has got to be a general realization on the part of the entire industry of the possibilities that research along technical problems holds for the improvement of the industry, to stimulate that research work to the greatest degree.—V.B.G.

# Buy Good Insulation; Put It On Right, Then Watch It Closely

By L. E. Cover
Armstrong Cork & Insulation Co.
*Read before W. P. R. A. Meeting, Fort Worth, March 3.*

THE business of insulation and the business of refining touch each other at so many points that I feel that for both of us there is much to be gained by establishing a little better understanding of each other's problems. Knowing more about insulation than I do about refining I shall talk about refinery processes only in their relation to insulation.

Insulation as we know it now has developed from its crude and inefficient forms almost entirely within the past 20 years. Many factors have contributed to its rapid growth.

The necessity for insulation in our present scheme of civilization was emphasized when the Division of Engineering and Industrial Research of the National Research Council set aside some of its funds to establish a Committee on Heat Transmission. The chairman of this committee is Mr. W. H. Carrier, president of Carrier Engineering Corp. Its membership is composed of men from the government departments, leading universities, large industries and insulation manufacturers.

### Widest Range of Temperature

The insulation problems of the refiner are peculiar in that he must insulate against a wider range of temperatures than any other single industry. Also the tendency to make all operations around a refinery continuous, or semi-continuous, as distinguished from the old batch system, means not only more expensive equipment, but also that the successful operation of this equipment depends upon keeping the temperature in each unit at as near a predetermined uniform level as possible. This means that insulation requirements must be carefully planned.

Refinery processes involve temperatures from 25° F. below zero to 2500° F. above. The principal use of cold temperatures and refrigeration is in connection with the various processes of separating wax from lubricating stock. These temperatures, depending on the process, range from 25° F. below zero to 20° F. above zero.

Storage of natural gasoline, crude oil and refined products must be insulated against the range of outdoor temperatures at your refinery plus the added heat of the sun on storage tank roof.

Distillation operations divide themselves into two phases; those under 550° which are the more common still temperatures you have been used to maintaining, and those over 550° up to even 1000° which are used in the various cracking processes. The introduction of pressures into these processes naturally demands better steel construction. It also requires a form of insulation that can be readily removed at the weaker points for inspection of the shell, and as readily replaced.

You also have to consider your still and boiler settings, breechings and other high temperature equipment.

In addition there are, of course, your steam plant and its lines, pumps of all kinds, and pipe lines carrying products to and from the various operations, involving all temperatures mentioned.

In considering these varied insulation problems of the refiner I wish to point out the three factors that are essential to a really first-class and economical job of insulation. These are:

(1) Selection of the correct material for the temperatures involved.
(2) Proper application of the insulation to the equipment.
(3) Effective maintenance of the insulation after it is installed.

I shall take these three items up separately. If in this discussion I stress strongly the failure of insulation due to neglect of any one of the above causes, it is with the thought that such cases are in the minority and that most installations are performing satisfactorily.

### Selection of the Correct Insulating Material for the Temperature Involved

Too often the first and only question the refinery engineer asks us is, "What is the conductivity of your material?" More on this phase of the subject later. What we wish to emphasize now is that conductivity is only one of the factors that determine whether or not the insulation is the correct one for the purpose intended. Among other questions which the refiner should ask of insulation are:

(1) What are its physical properties? Is it structurally strong? Can it be handled conveniently and without unreasonable breakage by our men? All insulations, to be relatively good nonconductors of heat, must necessarily be light in weight. Is this lightness in weight obtained at the sacrifice of strength? Too often the refiner used to working with steel, concrete, brick and other structural media expects insulation to have physical properties of like nature. It does not, of course; but it can and should have ample structural strength to insure proper handling and stability.

(2) Will the insulation withstand the temperatures of the process without deterioration either as to its conductivity or its other physical properties?

(3) How is the material affected by weather conditions?

(4) What action do fire and water have upon the insulation?

(5) Is the insulation furnished in convenient sizes? Can it be had in special shapes and sizes for the equipment?

(6) What is the expected life of the job and will the insulation pay for its use in this time?

(7) Is there a possibility of the insulation being reused? Should there be a change in equipment?

(8) What is the proper thickness to use?

To turn now to the question of conductivity. We find, too frequently, that the engineer accepts our conductivity figures with a smile. One elderly superintendent of the old school asked us in the first few minutes of an interview, "Well young man, where is your little piece of paper?" "What paper," we asked. "Why, the paper all you insulation men carry around showing where, by your tests, your own insulation is far superior to the other." As a matter of fact, we believe that the figures published by most manufacturers can be accepted without question.

Now let me draw an analogy between insulation and the steel supporting columns and beams of your stills and towers. Do you figure the exact size of the columns to use with a given load and temperature condition? You do; but what else do you do? You multiply your calculated answer by three or five or some other number for a "factor of safety," and then you multiply again by two to allow for the possibility of a fire, and thus arrive at your final sizes and thicknesses. Have you ever attempted to incorporate this "factor of safety" in your insulation calculations?

An excellent plan to follow in deciding on your insulation, is to picture in your mind an ideal insulation possessing all the qualities you consider essential for that particular job, plus this factor of safety. Then buy the insulation whose characteristics most nearly conform to this ideal.

### Proper Application of the Insulation to the Equipment

The second essential is the proper method of erecting insulating materials. Years of experience have taught us the

importance of careful workmanship when the initial installation is made. This does not mean that the work is so difficult that men specially trained are the only ones who can erect insulation properly, or that in buying insulation, the erection contract should necessarily be awarded to the insulation company. We feel rather that the refiner, who is one of the largest users of insulation, has enough of this kind of work all the time so that he can well afford to train men to handle it. Generally speaking, he will save time and money by erecting his own insulation. We also feel that the insulation manufacturer should be required to furnish erection specifications and instructions which shall be so complete that the finished job will be right.

The chief engineer of one of your large Texas companies recently said to me, "What is wrong with our insulations? You come here and tell me of your company's products, how good they are, how they are designed for my particular needs, and how long they will last. And yet I find, in going through our refineries, that much of the insulation is in bad condition."

An investigation of such conditions will usually disclose several basic reasons why the insulation is not holding up.

In some cases we find that the insulation manufacturer had not provided a secure method of holding his insulation to the equipment; or, if he did, that the refinery erection crew devised a method of their own instead of using the original specifications. Recently, insulation, weighing about 500 pounds, fell from the head of a pressure still in operation. This weight struck directly on the 1½-inch tar line between the valve and the still. As the still had been operated for several years there was danger of the tar line breaking from such an impact. Investigation showed the insulation had been supported merely by wires fastened to a cable attached to the still. Continued heat had expanded and weakened the cable, and several of the wires had rusted through, allowing the insulation to fall. The insulation material itself was in good condition and would have performed its required work efficiently for years to come. The accident was due entirely to an incorrect method of application. There were 20 stills in this battery. Imagine, gentlemen, the consequences if this tar line on an operating pressure still had broken,

### Men Sometimes Indifferent

Frequently the insulation is specified or purchased by a central engineering department. When it arrives on the job, the men in charge sometimes take the attitude that the proper installation and use of the materials is up to the man who ordered them and they refuse to take any responsibility for it, or very much interest in how it is done.

Then again, the mechanical superintendent, who is usually responsible for insulation erection, and his principal assistants are usually interested in the new operation only until the pipes have been all connected and a pressure test shows the job to be sound. Insulation to them is a necessary evil which must be added later, but the big job is done and their attention is directed to some other new project. As a result, the insulation may be slighted to the serious detriment of the finished job.

Again I have found the insulation crew in one of our largest refineries to consist of one American foreman who could not read a blueprint, an Austrian sub-foreman who had difficulty in understanding English and a regular crew of Austrians who understood even less. You can readily picture what kind of workmanship results from this combination.

The remedy for these conditions lies with both the manufacturer and the refiner. It is the manufacturer's business first to devise a permanent and secure method of installation and then to see that complete and detailed instructions are furnished in all cases where the insulation is to be applied by the refinery employees. It is the refiner's business to see that the work is placed in charge of intelligent and competent foremen who can and will follow instructions and who can be made to understand the vital importance of careful erection.

In all cases where enough of this kind of work is being done, as it is in most refineries, a competent crew should be trained to handle insulation and all work of this kind should be done by them. In case insulation is only an occasional job, or insufficient to justify a regular crew, the best solution is a contract with the insulation manufacturer for the erection of the insulation, or, for the services of one of his competent erection superintendents.

Either method will usually insure careful workmanship and a substantial, correctly applied job.

### Effective Maintenance of the Insulation After It is Erected

It is evident from the trend of my argument that if you pay careful attention to the first two factors, namely, the selection of the proper material and the erection of this material in a substantial manner, the matter of maintenance will be very simple. If these two conditions have been fulfilled, proper maintenance means little more than a regular inspection of all insulation around the refinery, similar to your standard fire inspections. This will give you an opportunity to keep the insulation always in good shape. Your repairs will be small if made at once before any serious trouble develops. The inspector will see that all supporting devices are tight and in place; that all cold insulation is kept air-proof by regular painting; and that the weather proofing on all insulation exposed to outside conditions is kept intact.

A frequent source of trouble comes at points where equipment repairs are


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made. The insulation may be removed, not by the insulation gang, but by pipefitters, welders, boilermakers or others making repairs who seldom give any thought to its replacement. In many cases, the insulation foreman does not know that the insulation has been removed, and by the time he gets around to replace it, enough trouble has been caused to make the job a good deal bigger and the cost of satisfactory repairs far higher than they would have been if the work had been properly planned and taken care of in time.

So far in this discussion we have not mentioned one of the factors that too frequently determines the choice of insulation, that is, its cost. A paper could be written on this subject alone. The real cost of an insulation job is not the material cost plus the erection cost, but is the final cost of the job for the life of the equipment, and it necessarily includes all of the points so far discussed. If a buyer saves several thousand dollars by accepting one material and erection specification over another on a $50,000 order, this saving at the time is noticed by his superiors. But the engineering service, repairs, and maintenance come under another account and usually are absorbed in the general refinery overhead, so that the buyer, and his superiors, may never even know that, ultimately, this job has actually cost several thousands dollars more. The acceptance of another proposal with a higher first cost but far lower service and maintenance cost would have saved money in the end, often a great deal of money. Subsequent costs are just as much an element of final cost as is the initial price of the material and erection.

I have mentioned the matter of comparative tests on different insulations. In my experience I find the insulation manufacturers always ready to co-operate with a refiner when large-scale practical tests are suggested.

Invariably, we are told that under the conditions of operation, it is impossible to obtain comparative results or that the life of the test would be so long that the cost of obtaining the data would not warrant the result. Then, at times, we find that where tests were started, a change in personnel or other conditions brought about a loss of interest and a discontinuance of the tests.

On the other hand, I know of one chief engineer, who is responsible for seven refineries and other auxiliary equipment. He is recognized as a man who knows his job thoroughly. Let me tell you how he gets by.

His office is at one of the largest refineries under his supervision. Any salesman with some new idea or new equipment is sure of a fair and courteous hearing. If the idea looks good, a small order is placed and the equipment is installed in the refinery. Every Sunday morning at 7:00 o'clock this engineer meets the refinery mechanical superintendent at the plant and with a list of all tests, they go over the refinery with a fine-tooth comb. If in the course of time the device or equipment proves satisfactory, it is adopted for all the refineries. Do you wonder that this man is recognized by one of the larger Standard Oil Co. units as their most capable engineer? His ideas are adopted without question by the parent organization.

What provision have you in your refinery? Do you have some such practical methods worked out for testing not only insulation, but other new ideas presented to you?

Just one more point—in a discussion of insulation, a certain engineer remarked that insulation salesmen took up too much of his time. He stated that he could buy $100,000.00 worth of steel much easier than $10,000.00 worth of insulation; and that if he did not like the salesman personally, he would delegate the purchase of insulation to one of the youngest engineers on his staff. Of course, this man is an exception, but his attitude does indicate a certain tendency to slight the importance of insulation, which is more typical of the past than of the present. Just as in every other industry, insulation is coming to play a larger and larger part in plant economy and efficiency, so the refinery engineer who finds himself constantly under the necessity of improving processess and reducing costs is looking to insulation to help him out. He will not be disappointed, and I am here to assure you, gentlemen, that my own company, and I feel that I can speak with equal confidence for the whole industry, stands ready at all times to cooperate with you to the fullest extent in the solution of those problems in which we are mutually interested.

I trust, gentlemen, that I have succeeded to some extent in making one thing at least clear to you—that the insulation industry is by no means ignorant of your problems or indifferent to them. On the contrary, we are very well informed and keenly alive to the situation. Also we are already prepared with materials and methods which can be depended upon to give maximum results in the case of most of your requirements. For others, peculiar to your industry, we stand ready at all times to work with and for you to the extent of our ability through our research and engineering organizations.

MESA, ARIZ.—C. E. Golding, agent for The Texas Co. here, reports that his company recently doubled its storage capacity at the Mesa station and that it has added a garage and made other improvements.

BRADFORD, PA.—Herboth Mercantile Co., St. Louis, Mo., has been appointed distributor for Kendall Refining Co.'s motor oils in St. Louis and vicinity. The Kendall company's headquarters are at Bradford.

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# Oil Industry Should Fight Proposed Bill To Raise Oklahoma Taxes

By Harry H. Smith
Secretary Mid-Continent Oil & Gas Association
*Delivered at W. P. R. A. Meeting, Fort Worth, March 3*

AN examination of the statistical analysis from income tax returns known as "Statistics of Income for 1923," issued by the treasury department at Washington shows that the natural resources industries such as mining and oil production pay out a greater percentage of their profits for state and local taxes than any other line of business.

The percentage of these taxes to net operating income as given by that report is so high that I hesitate to quote the figure lest it be said that there is either something wrong with the statistics or that 1923 was an unusual year. But it is a fact that industries such as mining and oil have a peculiar attraction for local taxing authorities. The occasional and somewhat spectacular success made by a few seems to give the public the impression that these industries have extraordinary taxpaying ability.

The result is that in all states where mining and oil production are carried on, each session of the legislature attempts to increase the taxes upon these industries. The result is a lopsided and wholly unjust burden upon the raw materials so necessary for industrial progress.

These heavy taxes are as much a cost of doing business as are rents, salaries or wages. I think it is absurd for the tax agitators to contend that they can continue to pile these burdens onto these industries without unfavorable consequences to the public. Yet we have such an agitator in the person of one Campbell Russell, who has initiated in the State of Oklahoma a bill to increase the gross production tax on oil without consideration for the fact that oil is already paying more than its just share of the tax burden in that state. It is the bill known as Petition 89 and its ostensible purpose is to "equalize" the tax on oil with taxes upon other forms of property but, of course, the real reason and purpose behind the bill is to increase the taxes on oil production regardless of equalization.

### Equalization Not Sought

In fact, equalization is not what the author wants. If it was, he would be initiating a bill to reduce the taxes on oil. The initiated measure provides that all of the advalorem tax rates in the state, including those in the cities, shall be averaged and that, instead of the 3 per cent tax which the oil producers now pay upon the gross value of the output of their wells, they will be required to pay a percentage rate equal to the average of advalorem rates as computed by county and state officials each year.

The average of advalorem rates for the fiscal year ending June 30, 1926, will be the oil rate for the fiscal year ending June 30, 1927. By including the high local levies of the cities, the author of the bill expects to increase the tax on oil from 3 per cent to around 4 per cent or, in other words, an increase of from 25 per cent to 33⅓ per cent over the present tax. This will mean an additional cost of producing oil of between two million and three million dollars per annum if Russell's expectations are realized.

### Not Based on Full Value

But the apparent attempt at equalization is superficial because it disregards the very well known fact that the advalorem rates are not based upon full valuation of the property assessed. Although the constitution and laws of Oklahoma require property to be returned for taxation at 100 per cent of its fair cash value, it is notorious that such property is actually returned at a valuation of 50 per cent or less. If such property were really assessed at its fair cash value, an average of the advalorem rates would be less than 30 mills or 3 per cent even with the cities included and the effect of the bill would then be to actually reduce the tax on oil. But because the law and constitution have been persistently violated for several years Russell relies upon the continuance of this condition of affairs and thus hopes to mulct the oil industry under the false name of equalization.

The gross production tax is utilized in Oklahoma as a substitute for the usual advalorem tax on oil properties. The gross output of the well is taxed 3 per cent of the actual market price of the oil and this is in lieu of any other tax on the well itself. Careful investigation reveals the fact that this tax upon a depleting asset such as an oil well is equivalent to an advalorem levy of 3 per cent or 30 mills on the actual cash value of the oil property.

Because there is such a vast difference between the amount of the gross receipts to which the tax is applied and the net operating income procurable before the well is exhausted, the sale value of an oil well will seldom exceed the gross value of the output of a given year. The significance of this is that in Oklahoma today the oil producers are paying on a 100 per cent valuation while other property owners are paying on a basis of 50 per cent or less of cash value. If real equalization is desired these differences in valuation must be corrected because otherwise a mere comparison of rates is superficial and unjust.

### Gross Receipts Tax a Heavy Burden

Out of 60,000 oil wells now being operated in Oklahoma over 40,000 of them are small wells with a very narrow margin of profit, if any, resulting from their operation. A very large number are being operated merely to reduce the amount of inevitable investment loss, and without hope of a final profit. It must be conceded that an industry in this condition cannot carry a heavy gross-receipts-tax. The economist always points out that a tax on gross receipts is a dangerous thing and if rates are made high it may result disastrously to the operator with a narrow margin of profits. The tax upon oil produced at a loss as well as upon oil produced at a profit.

To the casual observer a tax of 3 per cent of gross may not seem like a heavy burden but when you consider that such a tax, because of the great difference between gross income and net income, may amount to a tax of from 25 per cent to 100 per cent of the net income you begin to understand the possible effect of any increase.

### Refiner Interested in Opposing Tax

The Independent oil producer in Oklahoma is going to oppose the Russell bill for three principal reasons. First, because there is no need for any additional revenue that the measure might yield. Second, because it would destroy the present, definite 3 per cent rate fixed by law and substitute the uncertain, indefinite averaged rate that the state officials might fix without consideration of valuations; and, third, because if it met the expectations of its author it would unjustly increase the tax upon an industry already overtaxed.

The Independent refiners will be interested in opposing the measure because many of them are also producers and in any event it will put additional cost burdens upon their raw material. The refiners and their customers, the automobile owners, are already paying the state of Oklahoma some 5 million dollars per annum upon the sale of their finished product, gasoline. The Russell bill would add another burden at the inception of the refining process,—upon the raw material.

But aside from these general considerations, the refiner has a more direct interest in the defeat of the Russell bill. It is this—the bill, if adopted by the

(Continued on page 48)

# Research and Practical Work Perfected Treating Process

NEW YORK,

DR. LAZAR EDELEANU, inventor of the sulfur dioxide process for which was described in the Feb. 24 issue of National Petroleum News is in this country primarily as the official observer in behalf of the Roumanian government of the proceedings and conclusions of the Federal Oil Conservation Board.

His research into the chemistry of petroleum which resulted in the discovery of the value of sulfur dioxide treating on a commercial scale, dates back to the time, more than 20 years ago, when he was appointed head of the chemical laboratory of the Roumanian government.

The Roumanian oil industry at that time was laboring against an almost impossible condition in meeting the competition of foreign companies in the production of burning oil, the chief product desired in European markets at that time. The kerosene made from Roumanian crude oil was greatly inferior to those made from other crudes and could not be successfully marketed in competition with them.

*Dr. L. Edeleanu*

The job given Dr. Edeleanu was to find out the reason for the inferiority of Roumanian oil and the remedy for it. Chemists up to that time had gone on the assumption that if a kerosene was produced from Roumanian oil having the same characteristics, flash, fire, viscosity, gravity and so on as Pennsylvania kerosene, it would have the same burning qualities as Pennsylvania kerosene.

However, this proved not to be true and Dr. Edeleanu found that the poor burning quality resulted from the presence in the Roumanian kerosene distillate of various substances, aromatic hydrocarbons and resinous materials that were not present in the kerosenes that burned well. Fuming sulfuric acid was used in treating but although this remedied the poor quality to a large extent, the losses were so large that the treatment was unprofitable.

The doctor experimented with various solvents, alcohol, acetic acid and others, all of which gave the desired results but were too expensive to be practical.

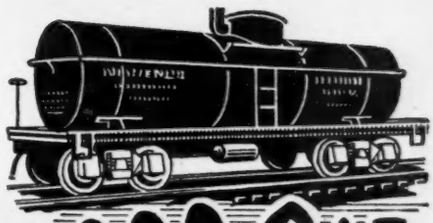
He found that sulfur dioxide furnished the ideal solvent, in that because of its low boiling point it was easily recoverable from the treated distillate and could be used over and over, with very little loss.

During his employment in the government laboratory, German capital entered the Roumanian oil business on a large scale and Dr. Edeleanu was offered the management of the Vega refinery at Ploesti. There was a law in the land forbidding any government technologist to hold employment with a private company but this rule was waived by the government in Dr. Edeleanu's case and he remained head of the government laboratory and head of the refinery at the same time.

These two positions offered him rare opportunities to verify the results he obtained in his research work in the laboratory by actual experiments on a commercial scale in the refinery, with the result that his discoveries in the work on sulfur dioxide treating were developed and reduced to a practical commercial treating method.

Having perfected the process for treating kerosene, Dr. Edeleanu turned to its possibilities for treating other products. Realizing that in most American refineries, the treating of kerosene alone would not be of sufficient importance to justify the investment necessary to build a sulfur dioxide treating plant, especially a batch treating plant, he has developed a continuous treating plant in which, he says, the refiner can treat all of his kerosene, all of his lubricating oil and in case he operates a cracking plant, his gas oil to prevent or minimize the corrosion of equipment in the cracking operation. The proportion of liquid sulfur dioxide used, the time of contact and the temperature at which the treating is carried on would vary with the nature of the product treated.

The rights to the sulfur dioxide treating process are owned by the Allgemeine Gesellschaft fuer Chemische Industrie in Berlin. Dr. Edeleanu is managing director of this company.

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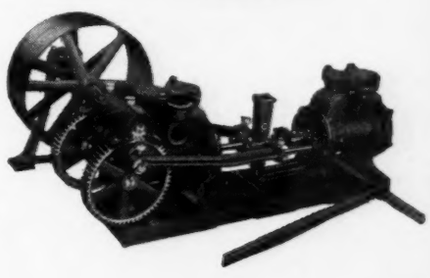

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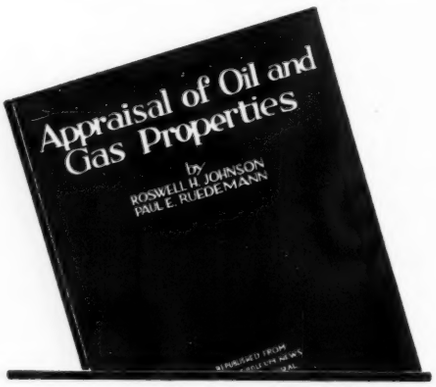


"APPRAISAL OF OIL AND GAS PROPERTIES" by Dr. Roswell H. Johnson and Paul Ruedemann gives more detail as to working methods, with drawings and charts, than has ever been offered the oil industry in a work on appraisal.

The book contains 24 chapters as follows:

Kinds and Purposes of Appraisal; Definitions; Organization of Work; Calculation of Past and Present Yield; Line and Underground Loss; Estimation of Future Yield of Producing Wells—Methods and Decline Curves—Ultimate and Total Recovery—Undeveloped Areas, Proven and Unproven—Refinements; Prediction of Future Prices; Prediction of Future Operating Costs; Future Costs of Development and Improvements; Discount Factor in Annual Analytical Appraisals; Investment Risk; Computations for Appraisal of Wells; Valuation of Undeveloped Acreage—of Physical Property—of Intangibles; Computation of Depletion—of Depreciations; The General Report; Office Records; Appraisal for Fixing Rates; Appraisal of Casinghead Gasoline Production.

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(Continued from page 46)

people, would start a war between gross production taxpayers and advalorem taxpayers. As above noted, the constitution and laws of Oklahoma positively require that property assessed advalorem be returned for taxation at its full, fair cash value.

If by the Russell bill the oil producers are required to pay an average of all advalorem rates, you can rest assured that they will invoke the law and judicial decisions which say that the state board of equalization must raise the value to 100 per cent. When this is done your refinery, casinghead gasoline plants, tanks, pipe lines and other physical property will be put upon the tax rolls at a much higher figure just as the farm and the home values will be raised. The net result would be an increase in taxes assessed advalorem and thus the Russell measure would prove a boomerang to those who may have expected to see a portion of their tax burden shifted onto the oil producers.

Reverting to the opening paragraph of this paper to the effect that these natural resource industries are already being called upon for more than their just share of the tax burden, and deeming it self-evident that it is better for all lines of business to pull together for the common good and to refuse to let a tax-agitator set them at cross purposes. I invite the cooperation of the refiners in showing to the people of Oklahoma the real facts and dangers involved in this proposed legislation.

### Gathers Old Penna. Oil Negatives

NEW YORK, Feb. 26.—About 200 original negatives of the early oil development in Pennsylvania fields, have been preserved and are now listed and on file at the studio of John B. Kendall, photographer at Titusville, Pa.

The negatives date back to the '60's and included among them are the Drake well, Col. Drake as well as some of the more famous wells in Oil Creek, Pethole, Shamburg, Petroleum Center, on the Rynd farm, etc., according to W. W. Tarbell, Whitehall Bldg., New York.

Mr. Kendall, in conjunction with the Titusville order of D. A. R., has succeeded in getting together this old set of Mather negatives and any one interested in securing any particular scenes, can obtain them by writing Mr. Kendell.

DURAND, MICH.—One 14,000 gallon storage tank and three new pumps have been added to the equipment of the Durand Oil & Gas Co.

The company paid over $2,000 for its tanks, pumps and repairs on its station and also recently paid out 20 per cent to stockholders on their stock, reports E. Henry, manager.

DETROIT, MICH.—United Oil Refining Co. has completed two service stations here, one in the city and the other in the country leading out of Detroit, according to S. Arthur Goodson, general manager.

The longest way round probably *was* the shortest way home—until the advent of the Dubbs Process

Now, the wise refiner, instead of first skimming his fuel oil and then cracking the gas distillate therefrom, feeds all his fuel oil direct to the Dubbs Cracking Process and gets in one operation the greatest possible yield of good knockless gasoline and marketable coke

But if you still want to crack gas oil there is no way to crack it as profitably and completely as with the Dubbs Process

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# Knock Must Be Taken Out of Gasoline For Future Fuel Economy

By T. A. Boyd,
General Motors Corp.

CIVILIZATION today is founded upon slavery, much as that in ancient Greece and Rome was. Centuries ago in Greece, each freeman was said to have had an average of five slaves. We are much better served now. It has been estimated that each American has the equivalent of 125 slaves. Our slaves today are not human ones, of course. We have shifted the burden from the shoulders of our fellow-men and placed it upon the molecule and the electron.

It is an interesting and startling fact that of the 700 million horse-power which is now available in this country, the energy back of these 125 useful servants, more than half is in the form of gasoline engines. We have 20 million automobiles alone, the engines of which average at least 20 horse-power each, making a total of 400 million horse-power. And we have thousands of motor-cycles, airplanes, tractors, motor boats and stationary gasoline engines besides.

But how about the gasoline for running these hosts of motor cars and other gasoline-fed slaves? If they were every one to be worked at full capacity all the time, 24 hours a day, they would use up 300 billion gallons of gasoline every year. This is twice as much as could have been made out of all the crude oil that has been produced in the whole world ever since the time when the first oil well was drilled. Fortunately, though, we do not run our engines at full capacity all the time. We work only about three per cent of our gasoline-maintained slaves all the time; for, as you know, we used up a little more than nine billion gallons last year. But even this is a stupendous amount. It is equivalent to a 10,000-gallon tank car full every 35 seconds, or nearly two carloads per minute.

Surely this job you oil men are doing, in providing all this liquid for feeding motors is a great service to everyone. Today, in spite of the tremendous demands made upon it, the country's well organized oil industry is doing all of this extremely well. It is doing it, too, at an average cost to each citizen of less than 40 cents a week. For this very small sum, the oil companies of the country are boarding the equivalent of 65 servants for each of us. Why, it costs ten times this amount to feed one horse. The average man is paying more to the government for wars, past and future, than he is expending for gasoline.

### More "Pop" Than Gas

So yours is a most essential service, and one in which you are justified in feeling the greatest pride. Compare the real importance of the service rendered to humanity by the industry of which your are a part with that performed by the vendors of candy and soft drinks, for example. It is true that these things contribute much to the pleasure of the world. But if they should be lifted bodily out of our social structure, would civilization be set back any, or would we really be the worse for it? And yet the total business done by these industries amounts every year to more than the retail price of all the gasoline sold in the country.

This liquid that you men sell under the ordinary name of gasoline is a wonderful material. It is the boiled-down essence of prehistoric sunshine put up by Mother Nature in her kitchen of the long, long ago. It is not just an oily liquid, but concentrated sunshine, that you deliver to the public from your gaily painted pumps. And each gallon that you sell contains much sunshine. There is more of the sun's energy preserved in a five-gallon can of gasoline than nature puts into a whole acre of wheat or corn during a bright sunny day in summer.

The automobile is a chemical factory on wheels. Its principal product is energy—energy for moving itself and the load it bears along the road. Its by-products are the waste gases scavenged from its cylinders, and the unburned carbon deposited in its engine. The raw materials upon which this rolling chemical factory operates are gasoline and air.

And so, although you oil men may not think of your business in this way at all, it is really a chemical one. You are engaged in supplying raw material to the most numerous, and probably the most useful, chemical plant in the country. We have 20 million of these chemical factories. What other manufacturing business is there that has even one million plants? So far as your own petroleum industry is concerned, you have less than 300,000 oil wells, and only a little more than 500 refineries.

But every single automobile is a complete chemical plant. Its engine takes in the gasoline provided by your industry, mixes it with 12 to 15 times its own weight of air, and energizes the mixture with an electric spark. Then occurs one of the most important chemical reactions in the world. We call it combustion for short, and it gives us our heat and the energy with which we do the work of the world.

Accompanying is a diagram that ties together in a quantitive manner the principal facts about the composition of the fuel mixture breathed in by the automobile engine, and about the products blown out of its exhaust ports. The materials taken in by the automobile engine are gasoline and air—about 1200 cubic feet, or 100 pounds of air for each gallon of gasoline. Here we might drop the remark that considering the large volume of air required to burn a gallon of gasoline, all of which costs the motorists nothing, it is apparent that the "Free Air" sign, so conspicuous in many of your filling stations, has a much greater significance in motoring than just for the inflation of tires alone.

This gasoline that you sell to the motorist is a true chemical compound. In connection with the chart, it is composed of carbon and hydrogen—about five and a quarter pounds of carbon and one pound of hydrogen per gallon. The air that the engine must have, or it

## "Gasoline and Slaves"

*T. A. BOYD, engineer, head of the fuel department of the General Motors Corp., had the above caption for the subject of his address before the Michigan Independent Oil Men's Association in Detroit on Jan. 21.*

*When he had finished he was almost stormed with interrogations. Oil men hailed the president of the meeting for recognition so they could ask questions from the floor. After adjournment the jobbers gathered about the speaker's stand to copy his charts into their note books and make memoranda of his figures. It is one of the most interesting group of figures ever put in so many words for a group of petroleum marketers.*

*All of Mr. Boyd's address is not here reproduced. It took him about two hours to read it and space in any one issue of N. P. N. can hardly do justice to such a work. However, it has been "boiled down" with extreme care, hoping to preserve most of the ideas at the expense of some of the beauty of his talk.—Editor.*

will suffocate, consists, as you know, of a mixture of nitrogen and oxygen.

From the right of the chart it may be seen that the composition of the gas which issues from the automobile engine is entirely different from that which entered it, and was there digested in the engine's fiery stomach. That is to say, the engine takes in as its raw materials, chemical compounds of one character, and converts them into other chemical compounds of radically different character.

### More Water than Gas'

Without going into detail on the composition of the exhaust, I would call your attention to the interesting fact that for each gallon of gasoline the engine burns completely, it manufactures more than a gallon of water. Then, from the carbon of the fuel, it manufactures a large quantity of carbon dioxide, exactly the same as you find at the soda fountain.

But these products shown on the chart are only the by-products of the automobile engine. They are quite useless to it. The valuable thing that the engine manufactures out of gasoline and air is the heat energy with which it moves the motor car from place to place.

The amount of energy that is released when a gallon of gasoline burns is so large as to be almost beyond belief. The combustion of a gallon of gasoline generates heat enough to raise the temperature of 120,000 pounds of water one degree F. This may not sound like much. But consider the fact that in terms of work—and heat and work are mutually convertible, one into the other—this is equivalent to the effort expended in lifting 450,000 pounds 200 feet high. It is enough energy to lift the whole General Motors building, with its 230,000 tons of stone and steel, 2½ inches above the foundation. This same is also the amount of work done in raising a Ford touring car, recent improvements and all, ten miles vertically in the air. Or, more practically, it is the amount of effort expended in pushing a Ford car 450 miles along a level paved road at 20 miles per hour. It is only 450 miles from Detroit to St. Louis.

Of course, the figures given above are based upon the utilization of every bit of the tremendous energy in the gasoline for performing the work under consideration. But in practice this is not done, and neither can it ever be done. Everyone knows how far the motor car really does run on a gallon of gasoline. It is only one-twentieth to one-fortieth of 450 miles.

Now, as we have pointed out on numerous occasions, it is one of the peculiarities of nature herself that stands in the way of the automotive engineer in his efforts to get more miles per gallon. This is that disconcerting thing which characterizes the burning of many fuels, and which we call the knock. It is now pretty general knowledge that the knock is the biggest boulder in the path to higher engine compressions, and to the larger fuel economies that accompany them. If it were not for the fact that most gasolines knock terrifically when run in the engines, we would like to use, the motor car could be made at once into a much more efficient machine.

### Two Characteristics

This brings us to the next point in our talk, which is that, from the standpoint of its operation in automobiles, the most important characteristics of gasolines are two; first, it must have a suitable degree of volatility; and second, it should be free from tendency to knock. The first of these determines the measure bf satisfaction with which the fuel can be used in service; the second fixes the compression of the engine in which it can be run, and so, pretty largely, therefore, the miles per gallon that can be obtained from it.

So the liquid we call gasoline is made up of a miscellaneous aggregation of tiny

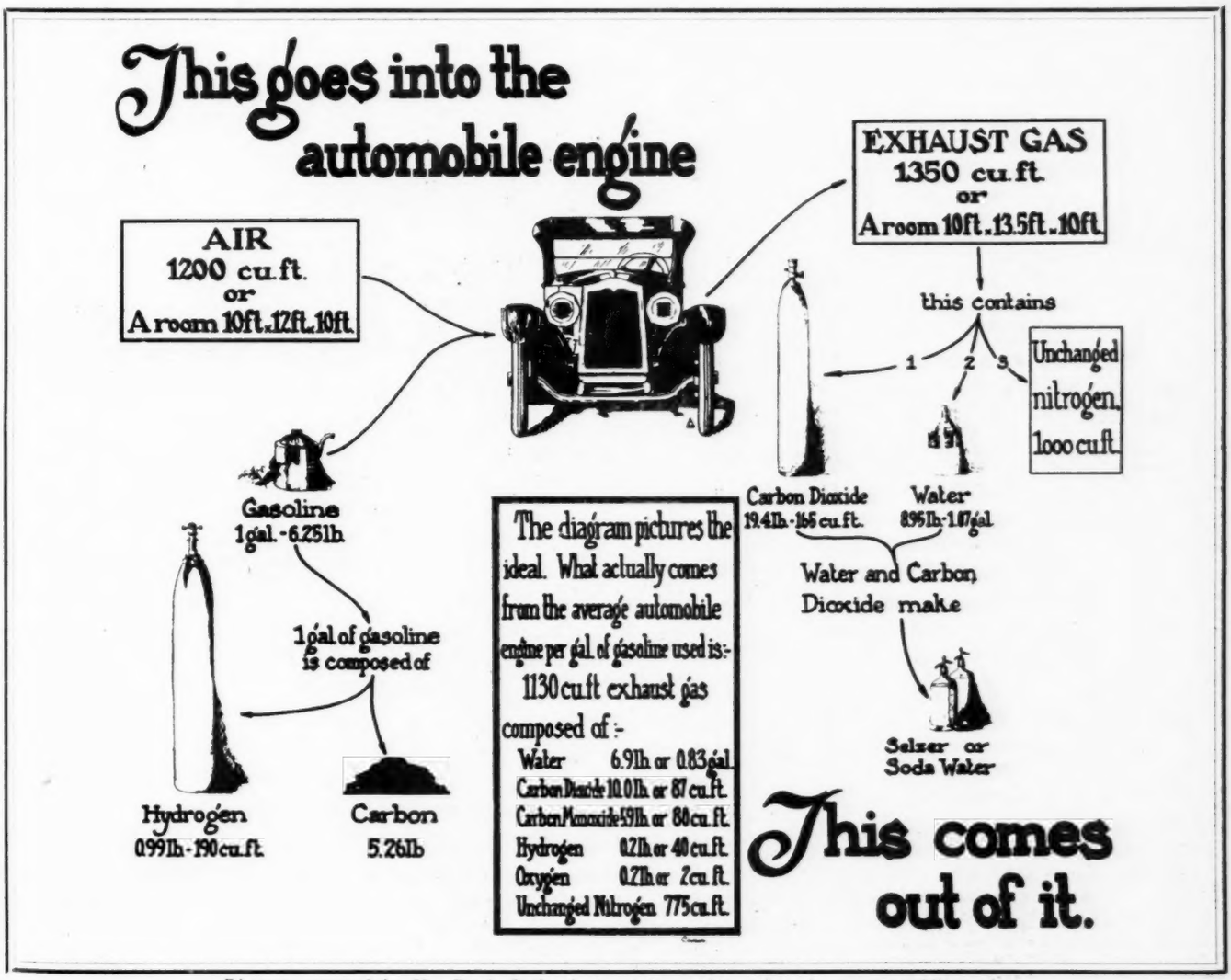


*Diagram prepared by Mr. Boyd of chemical reactions taking place in an automobile engine.*

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particles. And, when gasoline is breathed into the automobile engine as a vapor, its invisible particles of division swarm in the air like the dust of the minutest size. But no ordinary dust was ever so fine—so inconceivably minute. Fifty million of these infinitesimal particles would have to be placed side by side to reach an inch.

"How do we know that?" you ask.

Well, for one thing, when a little gasoline is dropped on a smooth surface of water it will spread out into film only the one fifty-millionth part of an inch thick. Naturally, the thickness of the film cannot be less than one molecule, for that is the ultimate particle of division. Although such a thing is utterly beyond conception, it may be said, for the sake of completeness, that there are 100 billion times a billion of these tiny molecules in just a single one of the little charges of gasoline that go into a cylinder of an automobile engine. It is no wonder that so fine a dust burns with tremendous power.

### For Uniform Volatility

Now, of course, the ease with which a gasoline vaporizes is determined by the relative size of these infinitesimal particles that compose it. And this size, in turn, is a function of the "mesh" of the screen that the refiner uses for separating it from the complex crude oil which is its source.

Here I would call your attention to the desirability of every petroleum refiner using a screen of the same mesh for separating our motor fuel from petroleum. It would certainly be a fine thing if all gasoline could conform to a universal standard, so far as ease of vaporization is concerned. It would help in the design, and especially in the operation of automobiles.

It is possible that the time may not be ripe for a universally uniform fuel. The refining industry may not be in a position to produce such a fuel in an economical way. However, the wide extension of cracking, the process by which a heavy oil that is difficult to vaporize has its large particles broken down into smaller ones that are easy to vaporize, is rendering it possible now for motor fuel to be made of uniform volatility everywhere within reasonably close limits.

Upon the second one of the desirable characteristics of gasoline mentioned above, namely, freedom from tendency to knock in automobile engines, we need touch but briefly. Gasoline must be made so that it will be free from knock, for the coming of the engine of higher compression, and therefore of greater power and better efficiency, waits only upon wide enough distribution of such a fuel.

There are those who think that one gasoline will give greater mileage than another simply on account of some mysterious property inherent in it. Now, such statements should usually be taken, as people used to say, "with a grain of salt." That is to say, with any given engine or car, the miles per gallon of fuel is pretty much independent of the source and of the characteristics of the gasoline used, so long as it is volatile enough to operate satisfactorily in the engine.

As a concrete illustration of the point I am trying to make here, let me cite you the following: The Society of Automotive Engineers, co-operating with some organization of the oil industry, with the United States Bureau of Standards, and with several of the automobile manufacturing companies, has conducted elaborate tests during the past two years to determine the effect of fuel characteristics upon miles per gallon. In these tests a considerable number of cars, 55 in all, of various makes and models, were run under carefully planned conditions on each of four fuels whose volatility characteristics varied over a wide range. The four gasolines ranged from one considerably more volatile than the U. S. Government specifications for motor gasoline, to one not quite so volatile as that. The results speak for themselves. The mileage per gallon for each fuel, average of all the cars, was:

| Fuel | A | B | C | D |
|---|---|---|---|---|
| Miles per gallon | 14.8 | 14.9 | 14.7 | 14.7 |
| Ton Miles per gallon | 22.8 | 23.3 | 22.8 | 22.7 |

There is certainly very little difference here. The variation between gasoline A and gasoline D is less than 1½ per cent.

These tests were conducted in summer. They were then repeated in winter with four fuels of a similar range. The winter results grouped as above were:

| Fuel | A | B | C | D |
|---|---|---|---|---|
| Miles per gallon | 12.8 | 12.7 | 12.4 | 12.4 |
| Ton Miles per gallon | 20.2 | 19.9 | 19.4 | 19.5 |

Here again the agreement between the widely different gasolines is remarkable.

And why should not the miles per gallon obtained with these different fuels be much the same? The available energy, as was pointed out earlier in this address, was almost identical for all. Concretely the energy content of a 58 degree gasoline does not differ from that of a 68 degree gasoline by more than five per cent. Thus, the heating value of the latter fuel is around 120,000 b.t.u. per gallon, and that of the former in the neighborhood of 125,000 b.t.u. per gallon. And so, assuming reasonable utilization, which the cars must have given or they would not have operated well, we would expect the energy output of one of the gasolines to be almost identical with that of another, as indeed it was.

Another valuable observation may be made from the data tabulated here. This is that with all the fuels, mileages in winter were about 15 per cent lower than those in summer. This, then, is the effect of cold weather upon fuel economy.

But, of course, as we have just said, it is possible for one gasoline to deliver a much greater output in miles per gallon than another. That is to say, it is possible, provided the characteristics of the gasoline in question are such as to permit the appropriate compression changes to be made in the engine that uses it.

The best and simplest way of doing this is merely to squeeze the mixture

of gasoline and air into a smaller volume before igniting it in the engine. The effect of this higher compression is to allow the hot gas to have a greater expansion when the fuel burns, and so to deliver more power.

Do not lose sight of the fact, though, that unless the engine is changed, the economy with which the energy of the fuel is utilized cannot be very much affected. Of course, the characteristics of the fuel must be such as to make it possible for the necessary changes to be incorporated in the engine in which it is used. This means simply that the aggravating tendency to knock, which is now characteristic of most commercial gasolines must be eliminated from the fuel of the future.

## Markets Large Percentage of Products by Boat

CAMPBELLSVILLE, KY., Feb. 27.—"Oil King" is the name of the boat that plies on the Cumberland River and markets most of the products of The Carnahan Oil & Refining Co., with headquarters at Canton, O. The company maintains bulk storage plants here as well as at Burkesville, Jamestown, Russel Springs and Columbia, Ky. The refinery and field office are at Creelsboro, Ky.

In order to create a demand for its products, the Campbellsville station gives away duplicate numbered tickets with each purchase of five gallons of gasoline. Each Saturday at 3 o'clock P. M., a drawing of the numbers is held. The first prize is five gallons of gasoline; the second prize, one gallon of Carmoline motor oil and the third prize, one-half gallon of motor oil. This has helped the company to introduce its gasoline and oils to motorists, according to C. J. Davidson, vice-president.

The Campbellsville station also furnishes gasoline to several curb pumps. The company was organized in 1921 by J. E. Carnahan, Canton, who is president and director and Mr. Davidson, Campbellsville, who also acts in the capacity of secretary, manager and purchasing agent, as well as director.

### Makes Cutting Oil for Auto Plants

DETROIT, MICH.—The plant formerly used by the General Motors Corp. here is now the home of the Detroit Oil Products Co., manufacturers of metal cutting oils. The company has been in business less than one year and is now supplying several of the larger automobile manufacturers with cutting oil. Equipment sufficient to handle requirements for this kind of oil throughout the country has been installed, according to W. J. McCartney, secretary and treasurer.

Formulas for making this oil have been developed by J. Winford Nagle, who is experienced in this business, Mr. McCartney states.


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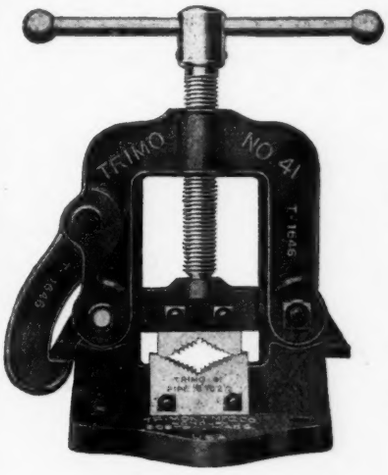


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# Proposal Made To Safeguard Potash Deposits Of Texas Areas

By Paul Wagner
N. P. N. Staff Writer

FORT WORTH, Feb. 27

TALK is being revived in parts of West Texas of using rotary drilling methods for oil development work because of the advantages of this system in safeguarding the potash deposits that exist over wide areas.

Virtually all development west, south and southwest of the northeast corner of Mitchell county has been carried forward with cable tools, hence it is impossible to measure at this time the extent to which rotary operations may gain headway.

The safeguarding of potash deposits may be accomplished in either of two ways, (1) by recourse to rotary drilling methods, or (2) by cementing off water horizons at three levels where they are found in deep drilling operations.

An idea advanced by proponents of the rotary system contemplates drilling to the 2800-foot level of Reagan county development, or corresponding horizons elsewhere, with this type of equipment; then setting one string of pipe and cementing it from top to bottom, thus preventing fluid from one or more of the water horizons entering the strata containing valuable potash deposits. When this single string of pipe has been set and cemented it would be operating practice to standardize and drill in with cable tools.

### Two Methods of Safeguarding

Proponents of the rotary method admit that a similar result would be accomplished in safeguarding potash deposits if permanent water strings were set at the three water horizons generally found at about 300-400 feet, 800-900 feet and 2100 feet. They say, however, that it would be cheaper to drill with rotary, set one string of 6⅝-inch casing and standardize at the producing level than it would be to operate under the cable tool method to which reference is made.

Present practice is generally to start with 12½-inch casing in the West Texas region referred to, drill past the first two water sands, through the potash deposits (which are generally richest at about 1300 feet), past the 2100-foot water horizon and then on down to bottom, where the 12½-inch, 10-inch and 8¼-inch pipe are all pulled.

The pipe pulling operation, it is suggested, threatens the future of the potash deposits because of turning the water from the 2100, 800 and 300-foot horizons into the potash strata.

Few rotary tests have been made in the West Texas territory considered, but one such Reagan county operation was completed in 55 days as against the 90 to 120 days generally required for cable tool drilling operations.

As against footage costs of about $4.50 for contract drilling under the cable tool method, the contract for the well drilled in 55 days was taken on a $5.50 basis. The Contractor was unable to make any money on the operation, it is cited, because it was a job that should have paid about $7.50 a foot.

In the foregoing connection, it is cited that the footage cost of rotary drilling is higher but the final cost of completing wells would be lower than under the cable tool system, besides safeguarding other minerals from contamination by infiltration of water.

It is mentioned in this regard that one of the important West Texas companies figures 33⅓ per cent depreciation on the three strings of pipe pulled from its wells under present practices.

Authorities differ as to the solubility of potash deposits found in association with salt in the underground strata of West Texas. Some of them set up the hypothesis that recovery of potash salts may come about, when the time comes for exploitation, under a system of reducing them to liquid form and thus taking them out of the ground; others insist that it will be necessary to sink shafts after the manner of hard mining operations.

In either event, it is set up, the desirability exists for safeguarding potash deposits in their present state; if damaged by water infiltration because of their solubility these deposits might very well lose a considerable part of their value, or if insoluble then mining operations might very well be hampered by the influence of water.

### Results of Potash Tests

Chemical tests made by the United States Geological Survey of cuttings from wells on the Big Lake field of Reagan county showed, according to a survey announcement some time ago, that rich beds containing potash exist from 1181 to 1687 feet in that territory.

Beds that are possibly relatively thin or of low grade were reported found at depths of 1181 to 1210 feet; thicker or richer deposits were found between depths of 1275 and 1325 feet; considerable percentages of potash were reported found in cuttings taken from between 1393 and 1445 feet; and as much as 3½ per cent potash was reported in material brought up from depths between 1480 and 1560 feet.

The geological survey announcement said with regard to individual wells in the Big Lake field:

"Cuttings from the Santa Rita well No. 3 brought up in the bailer from depths of 1305 to 1325 feet contained 9.75 per cent of potash, equivalent to 14.17 per cent of potash in the soluble salts, and cuttings from both wells taken between 1275 and 1305 feet contained a small percentage of potash, from which it may be inferred that a thin layer lies above a thicker layer somewhere between 1275 and 1305 feet. If the deposits in the entire interval between 1305 and 1325 feet are actually so rich as the analyses indicate the beds thus discovered should be of great commercial value.

"The cuttings representing the interval between 1346 and 1355 feet in well No. 3 contained 7.90 per cent of potash, equivalent to 9.10 per cent of the soluble salts. Smaller percentages in cuttings obtained at the two next lower bailing points may in part represent material derived from beds penetrated by the drill at higher points in the well.

### Within Mining Reach

"In the Santa Rita well No. 2 cuttings bailed from a depth of 1405 to 1415 feet yielded 9.27 per cent of potash, equivalent to 11.45 per cent of the soluble salts. Here also small percentages of potash, contained in material derived perhaps from levels higher in the well, were found on the two succeeding bailings. All the levels at which the cuttings unusually rich in potash were obtained lie within depths of about 1400 feet, and therefore within mining reach of the surface.

"The logs of wells Nos. 2 and 3 confirm the results of assays, made in April, 1923, of salts from well No. 1. All three wells show rich salts near the 1300-foot level, in a zone that may be as much as 100 feet thick. Although the potash seems to be concentrated in largest quantity somewhere in this zone, it may occur here in seams no more than a few inches thick. Zones of somewhat leaner salts seem to exist at depths of about 1200 feet, 1400 feet and 1550 feet, and more thorough examination with the core drill may reveal layers of workable thickness near one of these levels."

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KANSAS CITY, KAN.—The Associated Independent Dealers is a new organization here operating under the direction of H A. Leary, of the Leary Coal Co. Bulk storage has been installed and several modern filling stations have been acquired by the association.

# Michigan Jobbers Prepare Legal Fight Against Kerosene Inspection

By Ward K. Halbert
N. P. N. Staff Writer

LANSING, March 1

MICHIGAN oil men, as a group, have joined the ranks of those states fighting government inspection of kerosene. The case has not been filed but funds have been made available and the matter has been placed in the hands of Chamberlin, Marty & Fuller, attorneys of Cleveland, O. Five such cases have been placed in their hands. Three have been won and two are in court.

Oil inspection fees collected in Michigan in 1925 amounted to $115,932.24. Oil inspection is a steadily increasing source of revenue to the state as the consumption of refined oil in agricultural and highway tractors increases. In 1924 inspection fees brought $113,913.17 into the state treasury.

### Efficient but Unnecessary

Aside from the fact that oil inspection is unnecessary, it is more efficient in Michigan than in most state inspection departments, as politicians judge efficiency. The improvement in Michigan's oil inspection practices came in 1921 when an act of the legislature combined several unclassified state departments and placed them all under one head in the Department of Public Safety. Thus the department of state police, the state fire marshal's department and the oil inspection department all were consolidated.

The first oil inspection law was enacted in Michigan in 1881, and for 60 years after that the oil inspecting job was carried on in the manner usually employed by such departments. There was a chief oil inspector appointed by the governor and this chief appointed local oil inspectors. The local inspectors went through the motion of inspecting kerosene for 40 cents a barrel or $5 for 26 to 50 barrels—on a graduated scale of fees.

But in 1921 that condition changed. The commission of public safety was made the state oil inspector, the state fire marshal and chief of the state police. In the natural order of things the policemen, who are salaried men, were assigned the work of inspecting kerosene imported into the state. This is an economy from the state's standpoint only. The oil men have paid as much for having their kerosene inspected as they paid before.

### Not Much Improvement

Under the old plan the chief oil inspector drew a salary of about $1,500 a year and did clerical work exclusively. That was not such a bad job just after the Spanish-American war. The old law allowed for 26 inspectors as a maximum, but only about a dozen were used. Oil inspectors always tried to keep friendly with the oil men, because the inspectors were politicians primarily and oil inspectors on the side. In those days when an oil man got a car of kerosene he unloaded it and sent word to the oil inspector at his convenience. When the inspector came around the oil man helped him make out his report sheet, paid him $16 and everybody was happy. But that day has passed.

Now there are 170 state policemen and all are supposed to inspect kerosene if required. It is estimated at the office of the commissioner of public safety that 75 of them actually do some inspecting. Two do nothing else. When an oil man in Michigan in 1926 gets a car of refined oil he telephones the nearest state police headquarters, whence a policeman is sent to inspect his oil.

Under the rules of the department the car seal on every load of kerosene may be broken only by a policeman. The ordinary procedure is for the policeman to get to the oil man's bulk plant as quickly as he can, break the car seal, make the test with a Foster cup to be sure the sample will not emit a combustible vapor at 120° F., or lower, and make out a triplicate record of the test—one copy for the oil man, one for the police headquarters and one for the commissioner in Lansing. And in most cases that is what takes place. Of course, there have been exceptions. Some ugly situations brought about by inspectors have been reported, but they would be overlooked if there were any reason for the inspection in the first place.

### Excerpts From Michigan Oil Inspection Rules

The standard test for illuminating oils in Michigan is anything over 120°, Fahrenheit's thermometer, and all illuminating oil that will bear a flash of over 120°, as shown by the Foster apparatus, can be legally sold in Michigan, and all illuminating oils that will flash at 120° or less cannot be legally sold or used in this state for illuminating purposes.

Heavy oils, such as superla signal and mineral seal oils for use in switch lights need not be inspected.

For inspection of oils deputies will charge the following schedule:

| Barrels | Amount | Barrels | Amount |
|---|---|---|---|
| 1 | $ .40 | 14 | $3.30 |
| 2 | .80 | 15 | 3.45 |
| 3 | 1.10 | 16 | 3.60 |
| 4 | 1.40 | 17 | 3.75 |
| 5 | 1.70 | 18 | 3.90 |
| 6 | 1.90 | 19 | 4.05 |
| 7 | 2.10 | 20 | 4.20 |
| 8 | 2.30 | 21 | 4.35 |
| 9 | 2.50 | 22 | 4.50 |
| 10 | 2.70 | 23 | 4.65 |
| 11 | 2.85 | 24 | 4.80 |
| 12 | 3.00 | 25 | 4.95 |
| 13 | 3.15 | 26 | 5.00 |

For 26 barrels and any number up to 50 inclusive, charge $5. For over 50 barrels the charge is 1/5 cent per gallon for the entire amount inspected.

### Policemen not Politicians

Members of the department of state police are not politicians or members of any diplomatic corps. Some oil men in the state complain that policemen approach them just as they would approach a bootlegger or a highwayman; as if it were not only dangerous but disgraceful and criminal to have kerosene about a place of business. That attitude can be overlooked in a policeman, of course, but the ignorance that has been manifested on some occasions, (when they fired up their little machines in a warehouse) is not so easy to overlook.

These state policemen are supposed to be highly versatile individuals. They give first aid to the wounded; they are executive officers; they are oil inspectors, and they are a number of technical things. They are not chosen by political favor but are selected by civil service examination. It is not much of a mental test—mostly a physical examination. Preference is given to former soldiers, sailors and marines. They do not even have to be long residents of the state.

When a new policeman is employed he is given a book of instructions on his several duties and about three weeks' schooling. In those three weeks he is expected to learn to do all the technical things in his line of duty. The brevity of the school term is sufficient in itself to indicate how much a man might learn about petroleum laboratory apparatus, to say nothing of first aid surgery. The ignorance of the inspector, coupled with the arrogance of the "cop," has tried the patience of the oil men at times.

### Economic Administration

The oil men in Michigan do not bring a wholesale indictment against the department of public safety. From the time it was formed in 1921 it has been a profitable revision of the old method, so far as the state is concerned. The men in charge of it have done some

good work in administering the law, and certainly they are not responsible for the existence of the law.

Allen G. Straight of Mount Clemens, Mich., the present commissioner, has two oil inspectors who effect an economy by being stationed outside of the state. One is on duty at Whiting, Ind., and the other at Toledo, O. They inspect kerosene bound for Michigan before it leaves the refineries.

More than half of the kerosene consumed in Michigan comes from the suburbs of Chicago. The inspector at Whiting in November, 1925, inspected 2,456,274 gallons of kerosene as against a total of 4,817,108 gallons inspected for the whole state that month. The work of the man in Toledo was second in volume, of course. For this economy the department is entitled to credit but it is not an economy to the oil industry. The fact that the inspection fees now go into the state's general fund instead of into the pockets of the administration's political friends, is nothing to the oil men. They simply are paying dearly for a prefunctory performance, an unnecessary gesture in the questioned interest of public safety.

Thomas Bright, chief clerk of the department of public safety, asserts that the inspection of kerosene in Michigan results in the rejection of six or eight cars a year. He keeps the record of these "off specification" cars, together with the tests of samples made by the state chemist. The last instance of a rejection was on Nov. 24, 1925. W. C. Geagley, state analyst, tested several samples from the car after the inspector had found that it flashed too low. Mr. Geagley submitted a written report to the effect that the average flash was 108° F., and that one flash occurred at 99°.

### State Is Not Responsible

In one sense of the word, inspection of kerosene is a service to the manufacturer outside of the state. It protects the outside refiner from any liability for damage in case a disaster develops from the carelessness of anybody, either a retailer or a consumer. The state assumes no responsibiilty State agents simply inspect incoming kerosene and record the flash point. After that, if a fire or an explosion develops in the use of kerosene, responsibility is fastened on the Michigan jobber.

When a Michigan jobber accepts a car of kerosene it has the state's O. K. to protect the refiner unless the jobber has evaded the inspection. And if he has evaded the law the jobber is guilty any way, and stands in a poor light in the eyes of the court should an accident occur in the use of that kerosene. In short, the inspection law is of no service whatever to the jobber, to say nothing of the loss of $16 a car possible profit.

It is ridiculous to think that inspection makes the use of kerosene in the state any safer. It certainly has not prevented accidents in Michigan. That is unfortunate, but an occasional newspaper account of life and property loss by oil explosion in Michigan is the biggest thing the oil men have to overcome in their fight against inspection—regardless of the fact that all the kerosene that ever developed a disaster had been inspected.

Ordinarily in cases of explosions the oil jobber has to stand suit, and sometimes has to pay damages. No matter if the accident results from a grocer getting his tanks confused and sells gasoline for kerosene; no matter if it happened when a housewife pours kerosene into a bed of hot coals to start a quick fire; no matter what happens, the jobber stands suit. The housewife may be entirely to blame but she is the injured person; the grocer may be to blame but he has no money with which to pay damage; the state is not responsible but its open records protect the source of supply. So the jobber is the defendant.

### Acts in Self Defense

Oil jobbers certainly do not court these disasters and liabilities. They inspect their kerosene themselves. They test the merchandise they buy in self defense. They would do that even if the state authorities never had thought of inspecting it for them. They do it now in many cases because they do not have any confidence in the results of a policeman's test. Causes of accidents develop after the official inspector has finished his useless function in compliance with the law.

There was no accident of any consequence in Michigan in 1925 but there was an accident at Royal Oaks in 1922 that caused a great deal of unfavorable comment against the oil industry, another at Niles in 1923, and another at Davison in 1924. Those incidents all happened after the oil had been inspected, but still they have a tendency to make a little prejudice in the public mind.

The inspection department has been put to a great deal of exertion in checking all the cars of kerosene that enter the state. Recently a double check system was instituted to prevent cars being unloaded without inspection. Now all the refiners that ship refined oil into Michigan, mail a letter or card to the department of safety telling about it. The card gives car number, contents, capacity, destination and consignee. The car's capacity is checked against the inspecting policeman's report. In case no report is made the department investigates the matter, checking back against bill of lading, and in some cases checking tank car capacity by E. B. Boyd's tank car directory. Seldom does the department ever let a consignee evade that $16 fee.

### Jobbers Pay Demurrage

If a policeman fails to show up at an oil man's jobbing plant in time to inspect a car before it starts drawing demurrage, the railroad looks to the jobber for the money and he pays. Mr Bright said there was only one instance on record where an oil company had complained of that to the department. In that case the Sinclair Refining Co. received a car of kerosene in a snow storm in the northern part of the state and the policeman said he was unable to reach the place on time. Sinclair charged the demurrage to the department, Mr. Bright said, and the department deducted the amount from the inspection charge, later taking it out from the pay of the policeman who dared not face the elements. In case a car is rejected it has to remain on side track until the state chemist has finished his investigation. In that case the refiner pays the demurrage, but that seldom arouses any complaint if the oil is off specification.

At the recent convention of the Michigan Independent jobbers in Detroit, the inspection question came up. Secretary James A. Gilmore started it by urging the oil men to pay into the "inspection fight" fund to the extent of $1 per car on their 1925 kerosene purchases, and thus form a pool to fight inspection in court. As mentioned before his efforts were successful and the case will soon be in court. Mr. Gilmore's talk was about as follows:

"It looks like a sure venture to win on. It is a bet of $1 against $16 that oil inspection in Michigan is illegal. The constitution of the United States provides that no police function shall be performed at a profit. It is a useless inspection and an unfair tax. Chamberlin, Marty & Fuller have not lost a single case. We need less than $3,000 to complete the fund."

### Jobbers Tell Experiences

In a few minutes after Mr. Gilmore sat down, a half dozen oil men had taken the floor in the interest of the fund. Some told how state policemen had come on their premises, had removed a sample of oil from their cars and had lighted a Foster cup to make the flash test inside an oil warehouse with "No Smoking" signs exhibited in all directions.

One of the most spirited talkers was C. A. Humes, Vassar Oil & Gas Co., Vassar, Mich. He related how he had paid his inspection fee on one occasion and the state department had lost a record of it. They had billed him a second time and he had written them the date and number of the check with which he had paid the bill, and also told them at what bank the check had been cashed and who had endorsed it. He had his canceled check but he could not satisfy them.

One morning while his car waited in front of the house and his daughter waited to be driven to the school she was attending in another town, Mr. Humes had a couple of visitors; one a state policeman, armed, and the other a plain clothes man. The man in civilian clothes made Mr. Humes show him the voucher while the uniformed

policeman paced up and down the porch.

"Passers-by might have thought they had come to look for contraband," Mr. Humes said, "aside from the fact that their presence proved that they doubted my word."

Robert Warner, Cass City Oil & Gas Co., Cass City, remarked, "I paid inspection charges last year on four cars of kerosene that an inspector never saw."

A. D. Dubuisson, Wolverine Service Stations, South Haven, pointed out that Indiana jobbers who truck kerosene into Michigan get their inspection free by the simple process of mailing a bottle of their wares to Lansing for the state chemist to examine.

## Drilling Test Well In North Florida

CLEVELAND, O., Feb. 27.—A deep test well is now being drilled at Monticello, Jefferson county, Florida, by T. F. Bray, vice president and treasurer of the Bray-Hawthorne Co., Inc., of Camden, Ark. The latter interest is a drilling contracting company, but the Florida venture is apart from the company's operations. The test is in the southwest of 17-2n-5e and is a little more than a quarter of a mile from the city limits of Monticello, which is seven miles south of the Florida-Georgia boundary.

At 120 feet a large crevice was encountered and it required an expenditure of more than $3000 to fill this with cement, gravel, lime and mud, according to Mr. Bray.

The backers of this venture have some 25,000 acres under lease. No stock is being sold but some acreage is being disposed of to help finance the test, which is intended to test all sedimentary formations of this region.

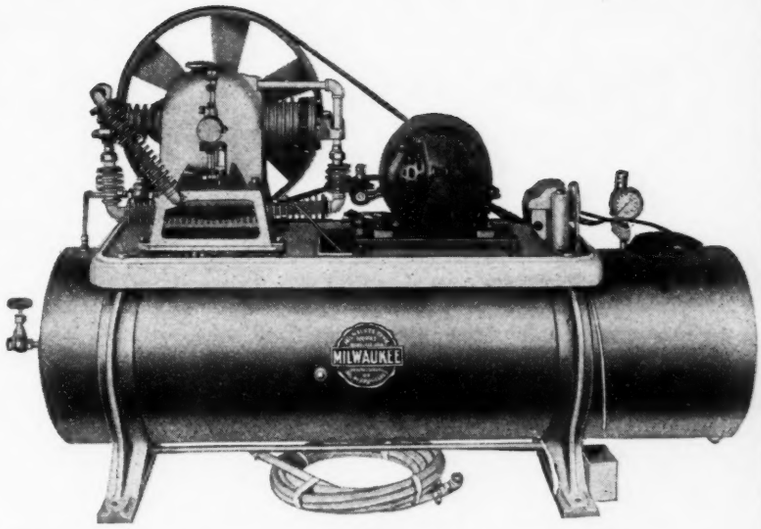
### Copyrights "Velvet" for Lubes

MILWAUKEE, WIS.—The O'Neil Oil Co., with headquarters here, has succeeded in copyrighting its trade mark name "Velvet" for its lubricating oils and greases. The O'Neil Oil & Paint Co. and its successor, the present O'Neil Oil Co., have enjoyed wide distribution of lube oils and greases under the "Velvet" brand and the recent decision of the U. S. Patent Office is expected to help sales, according to James H. Harrison, sales manager.

SIOUX FALLS, S. D.—Cumbow-Lanning Oil Co. has equipped its plant here to handle fuel oil.

The company is publishing a house organ called "The Gas Tank," according to J. H. Cumbow, secretary and treasurer.

OSBORNE, KAN.—A five-inch snow fall and rain stopped drillers at the Turner well here recently, reports J. E. Mason.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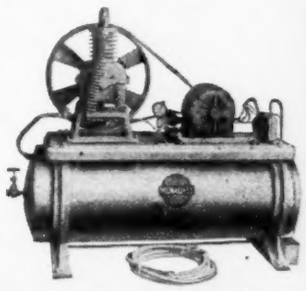

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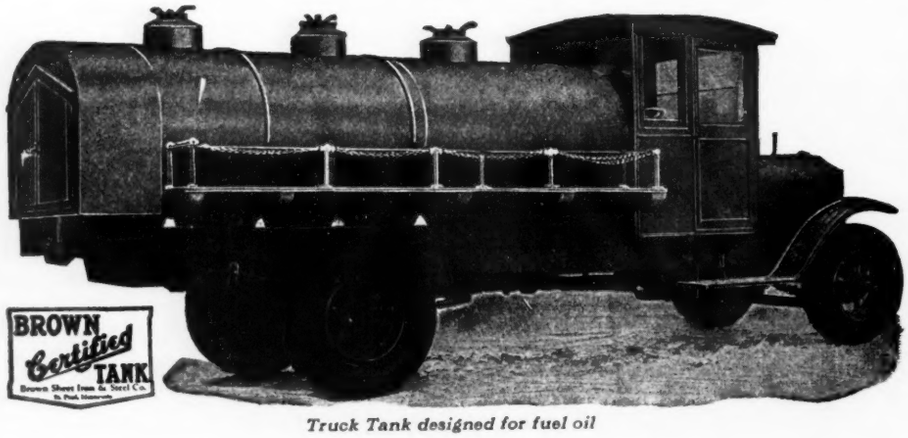


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# Savings In Refining Costs Are Being Passed On To Motorists

By Walter Miller
Manager of Manufacturing
Marland Refining Co., Ponca City, Okla.

*Delivered Before Petroleum Division, A. I. M. E., New York, Feb. 15-17.*

THE major improvements in refining, excepting cracking, might be listed as pertaining to:

Distillation,

Fractionation,

Treating, covering the purification and decolorization of the end products,

Wax separation, covering the removing of petrolatum from heavy lubricating oils.

The less important achievements deserving mention are in the fields of savings in evaporation losses, improvements in acid recovery processes, etc.

It is impossible to measure finally the effect of distillation or fractionation improvements separately because the two steps are too closely interwoven. While pipe still distillation offers some direct economy, yet the pipe still was not a complete practical distillation unit of itself until the more recent progress in fractionation equipment and methods had brought them to their present efficient state.

### Pipe Stills Save Fuel

The direct economy of pipe stills is a definite fuel saving over the average cylindrical still operation, perhaps a slight labor economy, and also a somewhat lower investment, depreciation and maintenance cost. These differences are not sufficient to warrant a very rapid scrapping of cylindrical equipment already in existence.

The indirect economy, the competition of pipe with cylindrical unit is of equal importance. What will happen—what is happening, is that the refiner with cylindrical still equipment will take advantage of the newer developments making for lower fuel consumption, such as improved fire box construction, better utilization of radiant heat factors, maximum heat recovery devices in the form of residual and vapor heat exchangers, condensers utilizing the incoming crude as condensing fluid, enforced velocity circulation within the still itself, and other means of heat conservation.

These factors fully applied will greatly reduce the quantity of fuel required, and I believe that in a comparatively short time it will be possible to operate cylindrical stills at a fuel consumption rate very close to the best pipe still practice of today.

The gradually increasing market value of liquid fuels as our cracking operations expand, will also be a most important factor.

*Walter Miller*

The economic effect of improved fractionation makes itself felt along two principal lines: Greater yields of the more valuable products and more capacity in the same equipment.

This latter is the result of two factors. One, the higher charging rate of the stills, and the other, elimination of redistilling any substantial part of the overhead products.

Theoretically it should be possible to obtain just as high a yield of the more valuable products by sufficient redistillation as could be obtained by modern fractionation. Practically, however, this is impossible.

The continuous steps of condensation and redistillation going on during the progress of the vapors through the modern fractionating towers, establishing a continuous series of equilibrium zones, brings about a degree of separation which cannot be equalled by any practical redistillation methods.

In addition, there is a loss of volatile products in each separate redistillation, having a direct effect in reducing the final yield. The increasing yield of gasoline obtainable from 2,000,000 barrels daily crude charge can only be approximated because of lack of clear statistics.

Assuming that about 1,400,000 barrels of the daily charge is light crude, and estimating 4 per cent increased yield on the light and 2 per cent on the heavy crude, gives a total of 25,000,000 barrels per year more gasoline from crude. This in my opinion would be a conservative statement of the difference in results between using the indifferent fractionating equipment of five years ago, and the most modern types in use today.

The increase in distillation capacity through the same equipment obtained by the use of the better fractionating methods is surprisingly large.

I have in mind a number of refineries in which a comparison of the capacity of batteries of stills operating under modern conditions shows ability to process from two to three times as much as the best previous records.

Some of these refineries, as they wish to increase their capacity, find it necessary only to modernize some of the older equipment at a comparatively small cost. If all of the distillation units in operation in the United States today could be converted, with a wave of the hand, into modern equipment our crude running capacity would be nearly double our present nominal daily rating of 2,500,000 barrels.

### Important Cutting of Costs

The effect of the above mentioned factors on cost of refining is of great importance. It costs no more, after the fractionating equipment is installed, to cut finished products directly from the stills during primary distillation than to take off unfinished products to be redistilled. At the same time the larger yield of gasoline gives a greater divisor and therefore a lower cost per gallon on the finished product.

No more direct labor is involved operating a battery of stills at 10,000 barrels of crude per day, than in running the same battery at half that rate or less. Less fuel per barrel of crude processed is consumed running the battery at a high rate because of lower proportionate radiation and other static heat losses.

I estimate a saving in the direct cost of primary distillation of the lighter crude oils, under the best operating conditions practiced today compared with those obtaining under the old condi-

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tions, of an average of 8 cents a barrel, and a saving on the heavy crude oils of approximately 5 cents.

### Saving on Depreciation

There is, however, another large saving made possible by the greater capacities. I speak of lower depreciation, interest on investment, taxation, and insurance, the overhead or indirect charges. A conservative estimate would be 4 cents per barrel saving on the light crudes and perhaps 2 cents per barrel on the heavy.

The total of these estimated economic effects, is staggering. To the extent that the industry has progressed from the earlier conditions to the best of today they are already effective.

When the industry generally has reorganized itself to take full advantage of all distillation and fractionation improvements known at this time, the difference between the two periods, based upon an approximate charge of 730,000,000 barrels per year, figures a saving in direct cost of $52,000,000, in overhead cost $25,000,000 and an increase gasoline yield of 25,000,000 barrels per year.

Assuming a higher product value of $2.50 per barrel on the increase in gasoline production totaling 62,500 000, we arrive at a gross figure of $140,000,000 per year.

The savings are being passed on to the consuming public as accomplished in the form of lower priced products.

### Saving on Crude Run

There is an indirect value not calculable in dollars and cents in this increased gasoline yield. Because it is the gasoline requirements of this country which dictate the quantity of crude oil being produced and refined, the making of 25,000,000 barrels more gasoline per year from 730,000,000 barrels of crude is equivalent to conserving approximately 70,000,000 barrels of crude.

It is not so easy to paint a similar picture of the economic effects of improvements in the treating of petroleum products. Taking gasoline treating as a starting point, it may sound paradoxical, but the greatest economic effect in treating straight run gasoline has been progress in fractionation.

Under old conditions heavy products carried overhead with gasoline, resulted in color problems. Today comparatively little of the straight run gasoline from crude is subjected to acid treatment. Yet our gasoline treating problems are more serious than before due to the ever increasing production of cracked gasoline.

These, with their appreciable percentages of diolefins and other highly unsaturated hydro-carbon compounds, react strongly with sulphuric acid and have a tendency to high polymerization.

An excess quantity of sulphuric acid is required to insure color stability With every increase in quantity of acid used there is a proportionate increase in both sludge and polymerization losses. The closed system, compared with the open methods, reduces the amount of acid required and effects a corresponding decrease in losses. The degree of saving effected varies with the original source of the cracked material and the manufacturing process.

The rule seems to hold that the higher the temperature used in cracking and the greater the degree of unsaturation in the raw material, the more difficult is the treating problem and the greater the losses.

In view of the extension of cracking operations, closed treating systems have increasingly greater economic effect as time goes on if they are not displaced by more efficient methods.

### Search for Better Methods

The search for better chemical methods as stated earlier in this symposium has not yet given us the answer. There is some promise of cheaper chemical cost, but with a greater number of more than offsetting manufacturing steps.

If it is the answer to this problem, as some believe, then the acid treating method in spite of the royalty charged, but also because the total losses, judging from experience to date, will be materially less than the combined sludging and polymerization loss resulting from sulphuric acid treatment.

The attitude of some cracking process owners is that inasmuch as the treated end product must be subjected to a heat treatment to remove the acid compounds formed in the treating, there is little advantage in making gasoline direct. If larger scale operations of vapor phase treating prove up the results so far obtained in its commercial use, it will eliminate the necessity for redistilling the gasoline and product of cracking stills. Competition will then force all cracking processes to improve fractionating and refluxing practice sufficiently to allow the making of gasoline direct from the operation.

### Centrifugal Wax Separation

The economic benefits of the centrifugal method of wax separation over the best of the prior art are more real than apparent. The cost of operation is about the same. The capital investment is somewhat greater. What then are the advantages that justify the refiner in installing this machinery? First—there is a greater yield of heavy lubricating oil or bright stock; the most valuable product obtained. The by-product petrolatum produced is a drug on the market, only a comparatively small proportion being marketed as such.

Second—it produces a lubricating oil of more universal application. The lower cold test of the finished oil allows of its use under temperature conditions formerly out of the question. This has had an appreciable effect on the manufacture of lubricating oils.

Prior to the introduction of the centrifugal separator, it was the practice of

some refiners to blend bright stock with a medium overhead oil for the purpose of making the heavier lubricants.

### Yie'd Increased

The degree to which this could be carried out was distinctly limited by the cold test of the bright stock component. The present 15 to 25 degree cold test bright stocks, compared with those of a few years ago of from 45 to 60 has made possible the extension of this practice. It is now feasible to use as a blending base an oil much lower in viscosity that that formerly employed.

The yield of high grade lubricating oil from paraffin or semi-paraffin base crudes has thus been materially increased, often by as much as 50 per cent.

Third—It has helped bring the paraffin base crude refiner nearer to what I term 'Stream Line' manufacture. Picture a plant making but two grades of oils; one a low viscosity neutral stock, the other a steady stream of bright stock, with no eddies or deviation in either current, until the final filtration process is reached. Then a converging of the two streams in various proportions as required. While this ideal may never be reached in practice, the centrifugal process has brought the refining industry closer to it.

### Evaporation Losses Reduced

Another important improvement relates to the reduction of evaporation losses of the more volatile products. A recent bulletin published by Mr. Ludwig Schmidt of the Bureau of Mines station at Bartlesville, Oklahoma, states that the average refinery evaporation losses when operating on Mid-Continent crude, including losses in run tanks, car loading, storage, etc. is 5.8 per cent of the total gasoline production. While these figures have not yet been generally accepted they represent the best conclusions of Mr. Schmidt after an exhaustive investigation during which many of the larger companies extended him all the facilities at their command.

Hence, Mr. Schmidt's figures must be given considerable weight. This investigation was conducted in the Mid-Continent where the proportion of volatile fractions is highest and his percentages cannot be assured to apply to the entire industry.

He presents, however, sufficient evidence to show that there is a great deal of preventable losses. Assuming the average loss throughout the industry is 4 per cent and that half of this is preventable by installation of evaporation saving equipment there would be an actual saving of approximately 5,000,000 barrels of gasoline per year, which at a valuation of only 10 cents per gallon gives a total figure of more than $20,000,000.

As an offset to this, however, a large investment would have to be made in proper conservation devices. The expenditure involved is a deterrent and


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progress will be made most rapidly along this line by the larger refining units and as a result of higher gasoline values.

In conclusion: I have shown how improvements in distillation and fractionation have reduced costs and increased gasoline production. I have attempted to show you how increasing gasoline yields and savings in liquid fuels correspondingly reduced crude oil producing necessities—how reductions of treating and evaporation losses increased this effect. You understand it will take the industry as a whole some time to put itself entirely on this improved basis but that considerable has been accomplished.

I believe that when we have gone the rest of the way the ultimate total economic improvement over the older conditions which will redound to the benefit of the consuming public, leaving out the effect of cracking, will amount to close to two hundred milion dollars a year.

And, gentlemen, we have not yet reached the end. Such is the momentum of our progress that I feel safe in predicting that if a similar review of the situation is made two years from today the new figures will make the above look small by comparison.

## Standard's Portion In Nebraska

LINCOLN, Feb. 27.—Charles M. Sutherland, secretary of the Nebraska Independent Oil Men's Association, recently issued a bulletin carrying an account of the taxes paid in the state under the provisions of the gasoline tax law. Roughly, two million dollars was collected in taxes. About one million was collected by five companies, and 473 smaller Nebraska oil companies collected the other million.

Total gallonage sold in Nebraska was 100 millions in 1922; that increased to 110 million gallons in 1923 and to 125 million gallons in 1924. In the first nine months of 1925 the consumption passed 110 million gallons.

While gallonage has increased, and Standard Oil Co. of Nebraska has increased its business accordingly, it has failed to hold its original proportion of the trade. Standard Oil Co., in 1921, sold 44.2 per cent of the gasoline; in 1922 it sold 39.42 per cent; 35.8 per cent in 1923; in 1924 only 29.26 per cent and 24.34 per cent in 1925 as indicated by the records of the first nine months.

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TOLEDO, O.—Howard C. Nellis, owner of the Big Tank Station, has just completed an up-to-date bulk and service station here on Dorr St., which is one of the most traveled highways in Toledo. Modern equipment has been installed, and Mr. Nellis plans to enter the oil jobbing business.

# Unit Operation of Oil Fields Certain To Increase Recovery of Oil

By J. O. Lewis
Consulting Engineer, Tulsa

*FOR greater emphasis the accompanying portion of J. O. Lewis' address to the Federal Oil Conservation Board is herewith presented apart from the major length of his remarks, which were published in two previous issues of National Petroleum News. The greater emphasis was considered advisable by the editors because of the breadth of the discussion which has been going on among oil men for a considerable time on the subject of unit operations.*

*Mr. Lewis has the background of experience in consolidation of properties; he and associates have played a prominent part in setting up the structure of two unit operations in Oklahoma—one where two or three companies were involved and a later one involving a larger number of companies and a large acreage. Both these were on fields where production was small and profits were doubtful on ordinary methods of production.*

*He advances the suggestion in the accompanying article that thought be devoted to unit operation of fields when they are new, instead of waiting until they reach the stage of exhaustion. Such cooperative development and operation should be wholly voluntary, however, in the opinion of Mr. Lewis and he voices an emphatic protest against any attempt at legislation to compel unit operation.—Editor.*

IN the experience of my firm in consolidating old properties, we find that the essentials are: First, that the operators be convinced of the gains to be made by unit operations; second, that they have confidence in the technical ability and the fairness of the management of the new consolidations; third, that a reasonably equitable and simple way of appraising properties be applied.

Once confidence has been established in the principle of consolidation and in the management, it was found comparatively easy to appraise the properties upon their relative productions, as the relative values of the properties were fairly well known and all realized that exact valuations were impossible, and so there was a give-and-take attitude on minor differences, particularly as they realized that without increased recovery, the properties would be valueless.

So far, four methods of consolidation have been employed in the old fields of Oklahoma, as follows:

1. One interest buys up all properties.

2. Undivided interests are assigned between the various property owners upon an agreed valuation so that each property owner owns pro-rata an interest in every other lease, the pool being operated by agreement by one of the companies.

3. The properties are assigned to a trusteeship and operated in the common interest, the expenses and profits being distributed pro-rata upon an agreed appraisal of the properties.

4. The properties are exchanged for stock in a new corporation upon an agreed basis.

### Divided Control Cumbersome

Other plans doubtless can be worked out that will incorporate the essentials of unit operation. The surrender of property rights is usually objected to first and many other plans for cooperation have been proposed, but none satisfactorily solve the problems. Never, to my knowledge, has a cooperative agreement with divided operative control held together in any stage of oil field operations. The last cooperative understanding with friendly neighbors on the eastern properties of my associates was recently broken through actions of the men in the field, unknown to their respective companies until too late to remedy. Line fights, loss of production, waste of pressure, unneeded expense followed either attempted cooperative agreements or independent operations.

The knowledge that a huge oil reserve of unrecovered oil is being left underground introduces a new element into the economies of the oil industry. Production, as a whole, declines naturally about 25 to 35 per cent from one year to the next, and to make up this loss, as well as to provide for growth in demand, it has been necessary to find new pools each year. The existence of new pools can only be inferred by geological evidence and not certainly known until drilled; consequently, there is always uncertainty as to the future oil supply for no one can foretell whether new pools will provide a feast or a famine.

The dormant oil reserves in the old pools are of different nature. Their existence is known definitely and it remains but to apply new methods, and the rate at which it can be brought to the surface is largely within the control of the industry.

### Unit Operation Reduces Cost

The cost of recovering this dormant oil will not be as much as many have thought. This will be especially true if the pressure method can be applied in unit operations. The cost of producing each barrel of oil is considerably reduced and this production will not be charged with the large costs of finding, acquiring and developing oil in new pools, which is increasing year by year.

The rate at which oil from these reserves will be brought to market will be largely in response to our needs. It cannot become a large part of the total production for a number of years, though if the process is applied to new fields as well as to old ones, the effect on the yearly supply may be felt sooner. When this stimulated production becomes an important factor, it may have an important influence in stabilizing the oil situation, as it will help to allay apprehension as to future supplies, and the production can be accelerated or retarded at the will of the industry. In mining and flooding, the program can be hastened or retarded in accordance with the attractiveness of the market, and, with pressure used in unit operations, production can be curtailed during oversupply and the pool charged with pressure which can be released when the flushed up production is needed.

Heretofore artificial pressure has only applied to old pools. The industry has waited until the patient was on his death bed before applying resuscitative measures. In fact, thousands of producing wells have been abandoned that could have been made to produce great quantities of oil by modern practices.

### New Approach Coming

But there is no reason to wait until the patient is in such desperate plight. It is not necessary to let a pool go through the long, lean, years of small production and high production costs. So soon as the natural pressure declines sufficiently, artificial pressure can be applied to keep up production. This will not only increase the total recovery but increase profits to an even greater degree. I believe the future trend will be to merge natural pressure and artificial pressure into one program. This will involve unit operation, or at least operation in blocks of considerable size. At this time this may seem entirely visionary; yet, I believe that in the next few years, the oil industry will become so convinced of the advantages of unit operation that they themselves will find a means of effecting it. It is pertinent to say that I am opposed to plans that have been proposed for forcing consolidation by governmental pressure. This

phase of the problem I propose to take up in later paragraphs.

The advantages of unit operation of new pools have been presented many times in the past. With the greater knowledge that has been gained more recently as to the principles of utilizing natural pressures, the advantages become more apparent..

The advantages claimed for unit operation for natural recovery are:

1. A saving can be made in the development and operating costs.
2. There will be less danger of damaging the field by defective wells.
3. Development can be better gauged to fit market demands and to effect most efficient oil recovery.
4. More oil, gas and gasoline can be marketed.
5. By regulating pressures, recovery of oil and gas will be greater and the wells will flow longer.

The advantages of such unit operation are very real and important in the usual type of oil pool, but the need is most striking where a body of free gas occcupies the upper parts of the oil sands. Typical of such pools are Cushing, Teapot Dome and Cromwell. In Cushing and Cromwell the fields were split up into many small leases, and the wells drilled into the gassy parts of the pool let off the free gas, reducing the pressure there and allowing the oil to be forced into this part of the sand and to be largely dissipated. At Cromwell the effect on adjacent wells by this blowing off of gas was very marked and caused an abrupt decline in oil production.

That oil will be drawn up into the gassy part of the sand is within the observation of every oil man who has seen a gas well permitted to blow until it is turned to oil. The oil drawn from the oil bearing part of the sand was the recoverable portion, but most of it becomes the unrecoverable portion as soon as it is taken up by the dry pores of the gas sand.

### Losses at Cromwell

Precise estimates of loss of possible production at Cromwell cannot be made, but the following figures are based upon sound principles and for illustrative purposes approach near enough to the truth. I estimate that perhaps one-fifth of the normally recoverable oil was dissipated into the gas sands at Cromwell by the method of development, but, if instead, the gas had been held in, it would have acted as an additional expellant for the surrounding oil bearing parts of the sand and would have increased the normal recovery by perhaps one-fifth.

One policy, therefore, causes a loss, whereas the other causes a gain over normal recovery, and the combined effect as estimated for Cromwell, would be to increase recovery 50 per cent or more by following the latter policy instead of the former. As the oil recovered at Cromwell paid but small profits over the development and operating costs, this additional recovery would have increased the net profits far more than the increase in actual oil effected. Also, fewer wells need have been drilled, and more gas could have been marketed, and from it, more gasoline recovered.

It is appropriate to point out here that in such a pool it will be necessary to refill the gassy part of the sand when artificial pressure is applied, and unless the pool is operated as a unit, no one can use the air or gas pressure method.

### Unit Operation in New Pool

These gains from unit operation under natural pressure would make possible further gains under artificial pressure along a program that my associate, Mr. Dunn, and myself have long envisioned. The pool could be drilled up from one or two centers, location by location, on the spacing and development program best adapted to the local conditions and times. Gasoline compression plants, larger than now justified, could be installed early in the life of the pool. As soon as the natural pressure in the parts of the pool first developed had declined sufficiently residue gas from the gasoline plant could be forced back into the sand, the gasoline plant thence forward becoming a combined gasoline and pressure plant. The gas in its passage through the rock picks up gasoline vapors which can be extracted during the next cycle through the gasoline pressure plant. During the development period of the field, more gas would be produced than needed, and this surplus could be marketed as the regulated conditions of development and operation would make safe the extensions of gas lines to the field.

But in addition to these gains from conserving gas and gasoline, holding up production and keeping down development expense, the restored pressure would aid greatly in reducing the expense of lifting the oil to the surface. By restoring the depleting pressures, the wells would flow longer and finally auxiliary gas lift devices could be applied, and in many fields, at least, it would never be necessary during the life of the pool to use a pump with its attendant installation and operating costs and trouble. Though gas and air lifts are now being employed occasionally, their usefulness covers but a few months' period in the life of the well, for after a while, the pressure in the sand declines to a point below the pressure necessary to flow the oil to the surface, and then the air or gas goes back into the sand instead of lifting the oil. Experience in the Powell field, Texas, illustrates this principle, but by maintaining the pressure in the sand artificially, air or gas lifts can be used indefinitely in many fields. My associates have over 1500 air lifts of a special kind in operation on their wells near Marietta, Ohio, though these wells produce but a fraction of a barrel of oil daily, and some of the wells are sixty years old.

The additional profits possible from well regulated unit operations will, we believe, be much greater than appears at first thought. The costs can be reduced in so many ways, the recoveries of oil, gas and gasoline increased to such an extent, and there are so many incidental gains that the cumulative effect should be to spread the margin between cost and gross income to a surprising degree, more than doubling net returns over those possible for independent operations can reasonably be hoped for.

At this time such a program may still seem entirely visionary to most oil men. Heretofore, we have never dared advance it publicly for fear of harming our reputations as practical operators, yet we have received such encouragement from the success in consolidating old properties, and we find so many influential oil men thinking ahead along similar lines, that it now seems possible for such a dream to be materialized before many years. When still others have the same vision and become convinced that they cannot hope to gain as much by independent operation, means will be found to effect unit control.

Frankly we are unable to outline any detailed plans for consolidating new pools which offers any reasonable chance of acceptance at this time, except in pools owned by a few companies. Consolidation is particularly necessary in such a pool as Cromwell, yet it would be most difficult to solve because the chief problem is to establish equitable and acceptable values for the properties, and it would be difficult to place acceptable values on the gassy parts of the pool which have both utility and nuisance values. Nevertheless, we are entirely hopeful that in time consolidations can be effected. The Union Oil Co. nearly succeeded in Colorado two years ago.

### Should Be Voluntary

Application of pressure to new pools is being tried out, and when results convince other operators that independence can be maintained only at exorbitant prices, means of getting together can be found. As a result of our experience and success in effecting consolidation in old fields, we believe that coercion on the part of the government would be both unnecessary and hurtful. The industry made a good start in solving the complex problems of consolidation and in creating a receptive atmosphere for the extension of the idea. We believe that the industry should be permitted to follow up this early success and to work out its own salvation.

My own experience of six years in government service in both technical and regulatory work has convinced me that a manner of operation can not be successfully forced upon the oil man. He rightfully demands that no matter how attractive a proposal may be, convincing demonstrations be made before he be asked to adopt it. Such demonstrations will soon be made in pools where consolidations have been or can be effected. It took three years to work out and to get plans accepted for consolidation of old pools, and the consolidation of new pools seems no more visionary to us now than the consolidation of old pools did three years ago.

# Construction of New Stabilizing Still Is Similar To Newton Absorber

By J. C. Chatfield
N. P. N. Staff Writer

TULSA, March 1

THROUGH an adaptation of the principles used in its absorber which has been used in natural gasoline plants for more than two years, the Newton Process Manufacturing Co. has developed a type of still designed to recover natural gasoline from mineral seal oil and stabilize it at the same time. One of the new stills has just been installed at the Bristow plant of the Victor Gasoline Co., one of the companies comprising the Chestnut & Smith group.

Application for a patent was filed by Daniel L. Newton on July 19, 1924, and was recently issued as No. 1,567,458. The apparatus is described by the manufacturers as being a stabilizing evaporator and blending still.

While the Newton absorber has been on the market for more than two years it was not until last fall at the time of the International Petroleum Exposition that the interior was described. The manufacturers desired complete protection under patents before disclosing the principle by which they use a foaming mixture of gas and mineral seal oil in the column.

### Divided into Sections

The absorber is divided into sections by a series of plates welded to the walls of the tower. These plates are perforated to permit an upward passage of gas. Over each perforation is welded a tube from the lower part of which two segments have been cut.

In operation, gas passing upward through the perforation in the plate draws mineral seal oil through the two openings in the lower part of the tubes, and gas and oil jet upward together in a foamy mixture. Overflow pipes from one section of the absorber to the one below keep a constant level of liquid and foam over each plate. Baffles on the plate direct the course of the liquid from one side to the other causing each part of the mineral seal oil to come in contact with the gas many times during its travel through the absorber.

### Same Construction in Still

The same general scheme of plates, jets and baffles are used in the stabilizing or blending still mentioned above. In the still there are no perforations in the upper plate. Enriched mineral seal oil is pumped into the top chamber of the still as indicated in Fig. 1, the accompanying diagrammatic vertical section of the apparatus. The rich oil is preheated before it enters the still

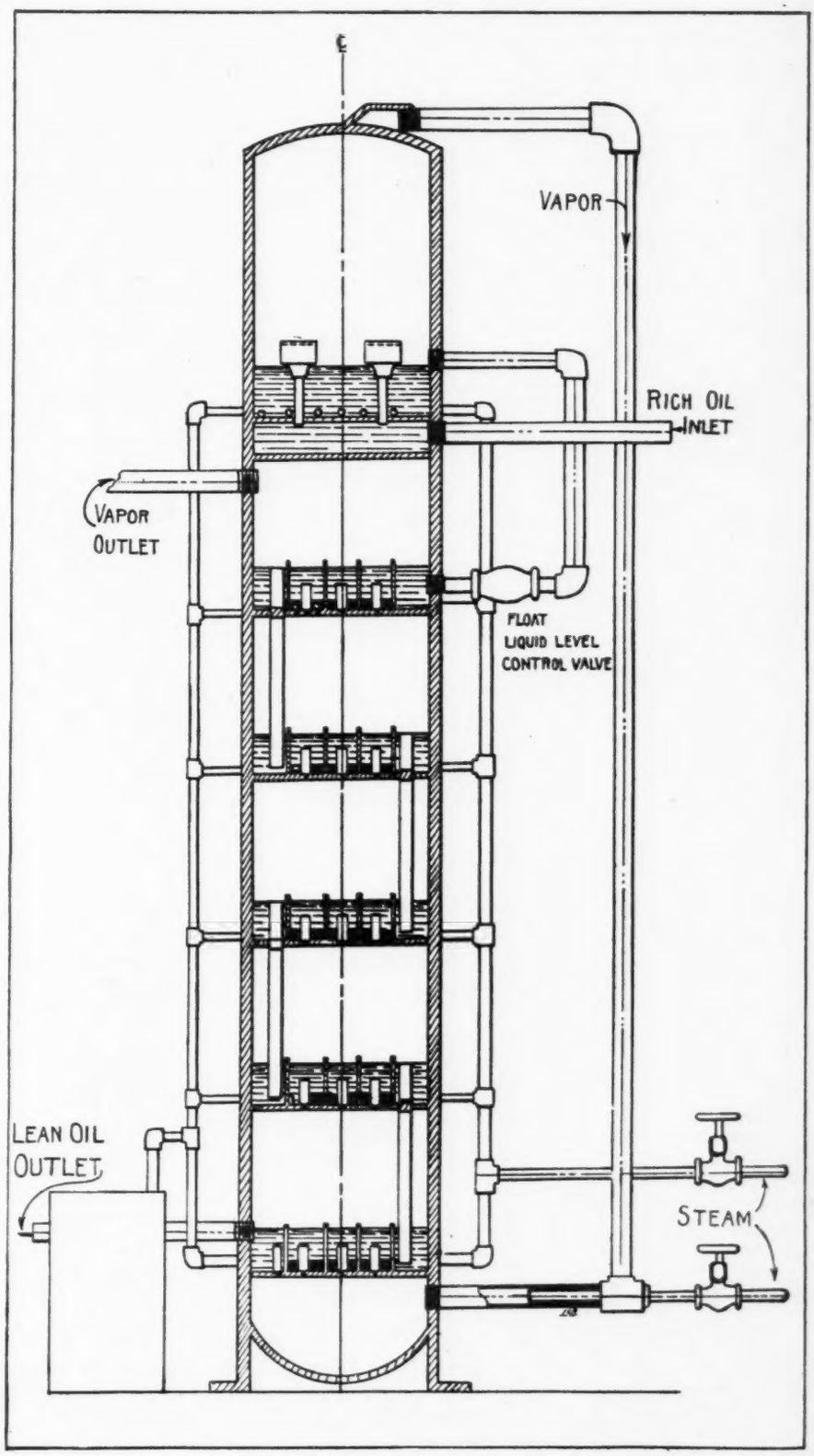


*Figure 1. Vertical section of Newton stabilizing or blending still which is an adaptation of the Newton absorber.*

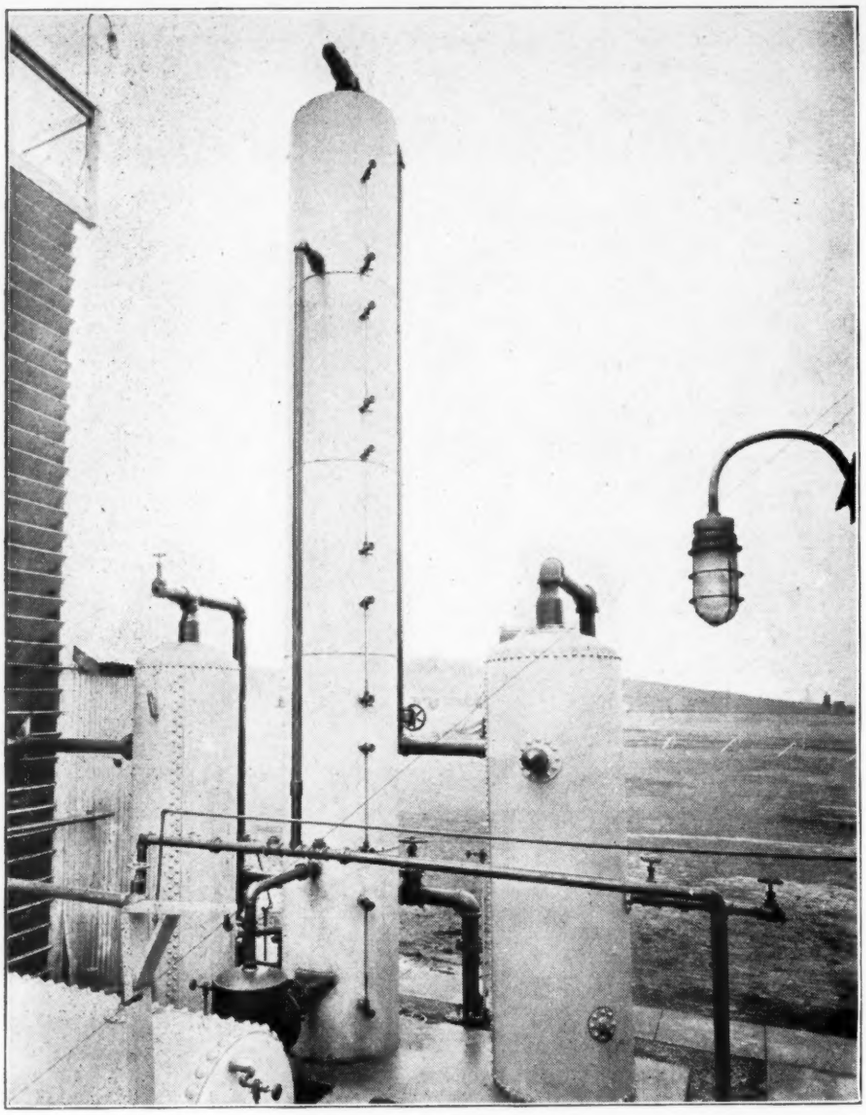

*Figure 2. Newton absorber at 8000-gallon Waite Phillips Co. plant, Beggs, Okla.*

and when released in the chamber through the two jets it gives up the lightest fractions of gasoline previously absorbed from the gas.

An outside overflow line equipped with a liquid level control valve conducts the partly denuded rich oil to the second chamber.

Gasoline vapor released in the upper chamber is drawn through the overhead line to the bottom of the still where it is injected with the aid of live steam. The steam jet in the line sets up a partial vacuum in the vapor line causing it to flow downward from the top chamber.

### Oil Made to Foam

The mixture of gasoline vapor and steam passes up through the perforation in the bottom plate causing a foaming of the mineral seal oil in the same way that gas caused the foaming in the absorber. The lightest fractions of the gasoline vapors thus come in contact with a mineral seal oil which has been almost denuded of gasoline and become an absorbing medium calculated to pick up the heavy ends of natural gasoline remaining in the absorber oil. The mixture of steam and vapor then passes upward to actuate jets on the plate above and are finally withdrawn from the second chamber from the top to be condensed, separated and the gasoline run to storage.

In addition to the live steam injected at the bottom of the still the mineral seal oil on each plate is heated by the aid of steam coils which are indicated in Fig. 1. Heating elements are arranged so that the oil is continually increased in temperature as it passes down through the still from compartment to compartment. In this way the gasoline is fractionally vaporized and added to the upward stream of mixed steam and vapor.

### Termed Blending Still

Designers of the apparatus worked out the process under the theory that the fractional vaporization of the natural gasoline and mixture of the vapors with heavier vapors throughout the cycle would produce a blended product which would be exceedingly stable. It is termed a blending still for that reason and because it has been utilized to make a direct blend of natural gasoline with refinery naphtha and gasoline to produce a finished motor fuel.

Steam for the still is controlled by a steam regulator which may be set to produce a given condition in the still. The operation may be regulated to produce any grade of gasoline from Grade Double A down to Grade C.

Operators of the Victor plant at Bristow are just getting under way with the still and thus far have been unable to come to any conclusion as to the effect of the use of the still on net production of the plant. The product turned out is a stable gasoline and may be varied in specifications as claimed but figures are not available to show whether the production is greater than formerly. It will be probably 30 days or more before any definite conclusion can be drawn.

### Differs from Others

The Newton stabilizer differs radically from the other types of stabilizers now in use in the industry. In others the gasoline is expanded in a rectifying column causing the creation of intense cold which condenses part of the gasoline and drops it where it meets warm gasoline vapor traveling upward from a steaming kettle. Alternate vaporization of the lightest fractions and condensation from cold produces a stable product.

Claims for the Newton process are that it permanently saturates heavy fractions of the gasoline with the lighter ones in one operation without the necessity, in an absorption plant, of distilling the mineral seal oil before stabilizing the product.

An improvement in the Newton absorber has just been announced. It consists of a device for adjusting the absorber to care for an overload of 30 per cent or a deficiency of 30 per cent from normal capacity. It is designed to meet varying gas volumes which may be encountered from day to day or over a period of time due to the addition of new wells or the decline of old wells. It is recommended for installation in a flush area where gas volume may be expected to decline more or less quickly.

### Adjustable Absorber

Adjustment is obtained by the addition of a second plate below each perforated plate in the absorber. The added plate is perforated and may be moved by manipulation of screws on the outside to enlarge or diminish the size of the apertures through which the gas must pass. It is claimed that an adjustment making a change of 30 per cent can be made in three minutes.

In the operation of Newton absorbers it has been found there is a gas velocity for each absorber which gives the greatest saturation of oil. This is termed the "point of most efficient velocity." A velocity which is too great as well as too low a velocity tends to keep the mineral seal oil from being whipped into a fine foam so that the gas is intimately mixed again and again with the oil.

# Cross Process Cracks Without Vaporizing Thus Saving on Fuel

By Dr. Roy Cross
Kansas City Testing Laboratories
*Read Before Petroleum Division, A. I. M. E.*
*New York, Feb. 8.*

THE Cross cracking process is not a pressure distillation process for production of gasoline. In this respect it differs from all other cracking processes. It is a pressure cracking process in which the reaction goes on without any expansion and under the usual operating pressure throughout of approximately 700 pounds per square inch and a usual maximum temperature of 860° F.

The oil is fed into the process continuously, into a heating stage followed by a reaction stage, after which the oil is released practically to atmospheric pressure and then distills from its own self-contained heat. This process is a practical illustration of the fact that there is no virtue in distillation or condensing under pressure for, in fact, it really shows that there is considerable virtue in not distilling while the oil is subjected to reaction.

Of the three zones involved in the operation, the heating zone, the reaction zone and the distilling zone, heat is not applied to the reaction zone or the distilling zone, yet approximately one-half of the possible conversion of the oil into gasoline is accomplished in one passage without any refluxing whatever.

In practice the cracking plant proper is of forged steel throughout, no welded or cast parts being used. A typical reaction chamber is a 150-ton steel forging, 50 inches in diameter and 42 inches long, with walls 5 inches thick. No accidental pressure can blow it up as this reaction chamber, as well as all the tubes and fittings, will withstand 10,000 pounds per square inch pressure before failure.

Explosions in cracking plants are caused almost entirely by accidental pressure and not by pressure at which the particular plant is designed to operate. The Cross process is designed to take care of accidental pressures and that is the reason it has proved to be a safe cracking plant.

Five years' experience in extensive commercial operation has verified this fact. The excellent construction has also been justified on the basis of the low depreciation and maintenance costs. The practical superiority of this method of cracking oil is shown particularly in the following points:

1. The safety of operation, which prevents loss of life or property and sustains continuity of operation. Most plants of the Cross process are now operating on more than 100 per cent. of their calculated capacity.

2. The low fuel consumption is occasioned by reason of the smaller amount of heat required by reason of the prevention of vaporization.

The heat applied is used in cracking rather than in vaporization, with the result that approximately 10 times as much cracking is effected in the reaction chamber as would be the case if vaporization were allowed. This obviates any necessity for refluxing. As a matter of fact, the fixed gas furnishes sufficient fuel to run the plant, no liquid fuel being required except to put the plant on stream when no gas is available.

3. Quality of the gasoline: Synthetic gasoline made by the Cross process has been thoroughly demonstrated to be better motor fuel than straight run gasoline. According to a test by H. K. Cummings, associate physicist of the U. S. Bureau of Standards, reported in the "Oil & Gas Journal" of Nov. 26, 1925, p. 65, gasoline made by the Cross process gives 19 per cent. more power than gasoline made by skimming Mid-continent crude oil.

Tests in the research laboratory of the Kansas City Testing Laboratory have shown that it is possible to make gasoline equal to a mixture of 40 per cent benzol and 60 per cent straight run gasoline as to its anti-detonating properties. As to its marketability, gasoline is now being made from the Cross process without rerunning of any kind, with a permanent 30-color. This fact alone eliminates at least 20 cents per barrel in the cost of treating. The high pressure is conducive to the formation of cyclic compounds out of unsaturated or olefine compounds.

4. High yields are obtained from the Cross process because end point gasoline is delivered directly from the plant, thus eliminating losses attendant upon rerunning, due to the low amount of fixed gas formation, the absence of any pressure distillate bottoms or naphtha fractions that cannot be cracked by the usual process, and also due to some polymerization of the fixed gases into cyclic compounds due to high pressure. Eighty per cent of gasoline from gas oil and 85 per cent from kerosene are not unusual yields.

5. The quality of the fuel oil residue is exceptional because of the practical absence of B. S. and the low viscosity of the residue. This is occasioned by the character of the cracking reaction, which tends to produce high specific gravity but low viscosity hydrocarbons instead of coke. The heating value of this fuel oil per gallon is greater than any known liquid fuel, free from sediment.

6. The simplicity and low cost of operation are characteristic features. A single unit producing 600 to 1000 barrels of gasoline per day may be operated by two men on a shift and by fewer men if there is a battery of these units. The normal operation is continuous for a week, but operation has been carried on in some cases for more than a month and regularly at some refineries on a two-week's schedule. The control valves are often set for hours without any adjustment.

These points are best illustrated by the following comparison of the guarantee of performance to a client with the results that were actually obtained on the test run. In this case the stock charged consisted of 48 per cent of fresh gas oil and 52 per cent of recharging stock obtained from the plant.

| | Guarantee | Performance |
|---|---|---|
| Hours on stream | 144 minimum | 167 |
| Gasoline with recycling, ultimate | 60 per cent. minimum | 79.9 per cent. |
| Gasoline without recycling (once through) | 30 per cent. minimum | 43.2 per cent. |
| Gasoline I. B. S. | 135° F. maximum | 94° F. |
| Gasoline E. P. | 437° F. maximum | 434° F. |
| Barrels (42-gal.) gasoline per stream day | 600 minimum | 899 |
| Barrels charge per run | 12,000 minimum | 14,450 |
| Liquid fuel (beside gas) for operation | 2 per cent. maximum | Waived—no gas burned |
| Recoverable products | 95 per cent. minimum | 97.4 per cent. |
| Fuel oil produced: | | |
| Carbon sediment | Less than 1 per cent. | 0.2 per cent. |
| Viscosity | Marketable | 82 sec. at 100° F. |

TULSA, Feb. 25.—Leo Ranney, inventor of the Ranney process for recovery of oil by mining, has gone to New York on business connected with the formation of his engineering company. Before returning to Tulsa two weeks hence, Mr. Ranney will visit Washington, D. C., Allentown and Bradford, Pa., Wilmington, Del., and other points east.

# Old Gas Field Used For Storage When City's Consumption is Lowest

By Lawrence E. Smith
N. P. N. Staff Writer

CLEVELAND, O. Feb. 27

SHIVERING householders speak feelingly about the gas company when the pressure drops in cold weather, drink their weak coffee, eat their underdone steaks and assert that the lack of gas is all part of a conspiracy against their welfare or at least, evidence of a dilatory spirit.

Not much consideration is given to the problems which a gas company, operating in regions subject to extreme cold winters, always faces. Gas companies are continually striving to provide against the comparatively short season when the demand curve shoots straight up. It faces that problem on the consumer side of its business; on the supply side it faces the gas producer whose sales, generally, must be curtailed in the summer months when the delivery rate, in cities where consumption is wholly domestic, is lowest.

Utilization of an old gas field as a storage reservoir was adopted several years ago by the Iroquois Gas Corp., of Buffalo, N. Y., and was successful in such high degree that the plan is still followed. Gas is stored in the summer months and withdrawn in the winter. Located as it is near Buffalo, this reservoir enables the company to augment its supply when needed and at times when the field supply will not care for the demands. In addition to helping the company to satisfy its customers, the method provides valuable information on underground reservoirs.

Through the courtesy of Thomas R. Weymouth, president of the Iroquois Gas Corp., and L. A. Brown, company executive, National Petroleum News is enabled to publish a comprehensive account of the unique method. Data used here were prepared by Mr. Brown.

### An Old Field

The field which is used for storage is known as the Zoar field and is owned by the Iroquois company. It is located in the southeast corner of the Town (township) of Collins and in the southwest corner of the Town of Concord, Erie county, New York. It is about 30 miles south of Buffalo. It is an old field, its discovery well being drilled in 1888 and from that year to 1914, one or more wells were drilled nearly every year. The discovery well had volume estimated at 18,000,000 cubic feet per day with rock pressure in excess of 600 pounds.

This well, which has been rated by some authorities as the largest gas well ever drilled in New York, was allowed to blow in the air for a considerable period in the hope that oil would come in but was later shut in and utilized as a gas well. At the end of 1914, there had been drilled 35 holes within an area of about 2000 acres. Twenty of these wells were dry, four were small gassers and soon exhausted and 11 were productive. There are now 17 producing wells in the field, in an area of about 800 acres, used as both intake and outlet wells in storing gas in the field and withdrawing it.

The country is hilly and is overlaid by deep glacial drift. From the surface to the top of the rock formations there is from 50 to nearly 400 feet of this drift.

### Gas Found in Limestones

Wells have an average depth of about 1900 feet and were productive in what is locally known as the "Flint" formation. This is the same given by the drillers to the very hard limestone formations geologically known as the Corniferous and the Onondaga limestone which overlies the Oriskany sandstone. The Oriskany is only five feet thick or less in the Zoar locality and gas has been found in it in several localities in the southern part of Erie county.

The field is "spotted" in its productivity. Of the 11 wells mentioned as being productive at the end of 1914, three were productive in the Oriskany sandstone while the other eight were "freaks" producing from one or more crevices or from porous spots in the Corniferous and Onondaga limestones, varying in depth from 10 to 130 feet from the top of the Corniferous. The thickness of these two formations varies from 160 to 230 feet, with an average of about 170 feet. The three wells producing from the Oriskany are in the western edge of the pool and those producing from the limestones are in the easterly end of the pool. A dry hole often is found within 300 or 500 feet of a large well.

### Of Variable Output

"The initial rock pressure of the field was a little over 600 pounds," writes Mr. Brown. "The wells were used largely as reserve wells and no data are available by which the total production could be estimated. One fact was quite noticeable in the behavior and that was that the delivery declined quite rapidly if the wells were left on the line for very long period but after being shut in for a few days would regain their volume. The largest well used to deliver at the rate of more than five million feet per day for a few hours and was used as a reserve well and turned on for the evening load into the main transmission lines and thence into the Buffalo plant about 25 miles distant.

"By 1914 the rock pressure of the field had declined to about 90 pounds and a compressing station was erected. When the wells were connected to the suction of this station, their behavior was very similar to that described above. The pressure and production declined rapidly but if the wells were allowed to remain shut in for a few days they would regain their pressure and volume."

During the winter of 1914-15, withdrawals from the field totalled 90,522,000 cubic feet and in the winter of 1915-16, withdrawals totalled 55,172,000 cubic feet.

The first storing of gas in the field, frankly experimental, was in the spring of 1916. Eleven wells were at that time productive. On June 15, 1916, before any gas was stored in the field, the rock pressure of the field was 48 pounds. The following data on the original tests are given by Mr. Brown for the first season of storage:

| Date | Pressure | Remarks |
|---|---|---|
| June 15 | 48 # | Storage began for first time |
| June 29 | 80 # | Gas shut off-13 million cu. ft. stored |
| July 5 | 76 # | Pressure steady |
| Aug. 7 | 76 # | Storage began again |
| Aug. 21 | 105 # | Gas shut off-20 million cu. ft. additional storage |
| Aug. 23 | 98 # | Pressure steady |
| Sept. 8 | 96 # | Storage began again |
| Sept. 16 | 112 # | Gas shut off-14 million cu. ft. additional storage |
| Sept. 20 | 105 # | Pressure steady |
| Nov. 23 | 102 # | Storage began again |

### Tests Indicate Tightness

"The fact that the pressure became practically steady or ceased to drop at a very great rate within a few days after gas was shut off was considered convincing evidence that the field was reasonably tight. During the winter of 1916 and 1917 the gas was taken from the field during peak load periods and some gas put back into storage during mild periods.

"The total amount of gas stored during the year June 1, 1916 to June 1, 1917, was 120,128,000 cubic feet and the amount of gas taken out was 168,768,000 cubic feet, or an excess of 48,640,000 cubic feet over the amount stored. This excess was the field's own produc-

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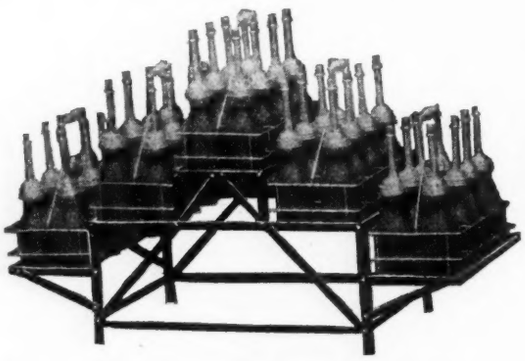

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tion which corresponds with the previous winter's production of 55,172,000 cubic feet and the second year previous of 90,522,000 cubic feet. From this record it was believed to be fairly certain that the experiment was a success. The only question was how much could be stored or how great a pressure would the field stand. Since that time the field has been used to a great extent each year for storage.

**Recovery Exceeds Storage**

"Up to June 1, 1925, there has been stored during the nine years a grand total of 1,849,200,000 cubic feet of gas and in the same period there has been withdrawn a grand total of 1,965,890,000 cubic feet. The production of the field accounts for the excess of withdrawals over storage. The greatest amount of gas in storage at any one time was a little less than 300,000,000 cubic feet when the field had a settled pressure of about 215 pounds."

No changes were made in the equipment or connections of these wells when they were used as storage wells, Mr. Brown says. All the wells are opened into one field line system which is controlled by a gate on the main line system through which the gas is either put in or taken out. Gas is stored in the field during July and August and withdrawn during the winter months, also on mild days in the winter some gas is stored and withdrawn on cold days. Buffalo's demand for natural gas is largely dependent upon weather conditions, as the load is almost entirely domestic and used for cooking and heating.

**Some New Drilling**

"The usefulness of the field depends largely on the amount of gas that can be withdrawn during about 12 hours of the day, on which hours the extreme peak load occurs," Mr. Brown says. "With a field pressure of about 150 pounds and a line pressure of about 100 pounds, the delivery rate is approximately 6,000,000 cubic feet per day. Within the last two years additional drilling has been done in this field in an endeavor to increase the delivery capacity. Fourteen holes have been drilled, of which only six were productive. Some of the non-productive holes were located within a few hundred feet of some of the larger wells. The delivery rate has been increased by about 50 per cent."

**Texas-Pacific Building Lube Plant**

FORT WORTH, TEX.—Texas Pacific Coal & Oil Co. is building a lubricating plant here which will include 20 Sharples centrifuges, a 158 ton refrigerating plant, a new contact filter plant with clay-handling equipment.

The new plant is expected to be completed by April and it will operate on Ranger crude from the company's own producing fields. The topping plant will be equipped with new Badger bubble towers and will have a capacity of 3000 barrels daily, according to E. R. Lederer, vice president.

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# BROTHERS —TRUCKS—

# Quick-setting Cements Now Widely Used In California Field Work

By C. C. Thoms

THE competitive drilling conditions in the deep "gusher" oil fields of of California have caused to be developed, during recent years, new methods and improvements in drilling operations which have for their primary object speed in drilling and the starting of production at the earliest date possible. The first well to reach the producing zone in a given limited area receives the benefit of the maximum gas pressure and sand saturation and usually produces more oil than any of the nearly offset wells.

Among other time-savers, the use of a chemical to accelerate the setting of cement has been generally adopted and has resulted in the saving of from six to ten days in the operation of shutting off water.

Under former methods of cementing, a water string was allowed to stand after the cementing operation for a period of ten days or two weeks, and sometimes even longer, before drilling out for test of shut-off. Several of the larger oil ompanies and well-cementing concerns, therefore, did considerable experimental work to develop, if possible, a cementing process which would shorten the time required for the setting or hardening of the cement placed around the water string.

### Chemistry of Setting of Cements

There are some disagreements in opinions as to the exact chemistry of the setting and hardening of cement It is generally agreed, however, that cement when mixed with water always sets. The finer the cement is ground, the quicker the setting. If agitated too long after mixing with water, it sets in small particles which do not join other particles and results in a spongy mass. Set cement contains only about 21 per cent water by weight and if it could in practice be mixed with that amount of water it would attain the same strength in one or two days as cement mixed with 40 to 50 per cent water attains in ten to eleven days.

Professor D. A. Abrams[1] states in a personal communication:

"The setting of cement is, of course, a process of hydration. The exact mechanism of this hydration is not completely worked out. There are two extreme schools of thought. One holds that the process is entirely a solution and subsequent deposition of interlocking crystals of the silicates and aluminates of lime. The other school holds that the hardening process is a formation of colloidal gels. It is probable that both

[1] In charge of Structural Materials Research Laboratory—Lewis Institute, Chicago. 2—42438.

*Editor's Note.—The accompanying article is from the October, 1925, monthly report of the state oil and gas supervisor of California, issued by the state mining bureau. The author is deputy supervisor, Dist. No. 2.*

conditions exist but the colloidal state predominates. The Portland Cement Association is at present conducting a comprehensive study of this subject in cooperation with the U. S. Bureau of Standards, but the studies have so far not been carried far enough to draw any conclusions."

### Setting and Hardening

Huber[2] makes the following statements regarding the nature of Portland cement and the chemistry of its setting, drawing a sharp distinction between a quick setting and a quick hardening cement:

"Setting and hardening are two very distinct chemical processes. A quick setting cement, as a general rule, is not a quick hardener. To make clear this distinction, a closer glance at the chemistry involved will perhaps be illuminating. Portland cement clinker is essentially a solid solution of various calcium aluminates in a tri-calcium silicate, much in the same way as steel is a solid solution of iron carbide in iron. Before grinding, Portland cement clinker possesses no hydraulic properties—it can be stored under water for an indefinite period without 'setting up.' Upon grinding to more or less of a powder it develops hydraulic properties, but the product is very quick setting, and develops only a part of its strength possibilities. In order to regulate the set, up to 5 per cent of gypsum (calcium sulphate) is added. This not only controls the setting time, but develops the normal strength. This action of gypsum upon the ground cement was not understood until quite recently. A normal cement can very easily be made quick setting by merely neutralizing the gypsum, but in doing this, the development of the strength is seriously interfered with.

"When a normal Portland cement is gauged with water to a putty-like mass, the first reaction taking place is the hydration of the tri-calcium aluminate which seperates as a colloidal mass. It is the coagulation of this hydrate which produces the first stiffening of the putty—this is the initial set, and is in fact, merely the absorption contained in the water and its partial fixation. At the same time there is formed a complex compound between the hydrated alumina and the calcium sulphate. This compound possesses the remarkable property of bringing about the hydration of the chief constituent of the cement, i. e., the tri-calcium silicate. It is to be hydration of this tri-calcium silicate, that Portland cement mortars owe their strength. This hydration is a comparatively slow process extending over a number of weeks. It does not begin until after about twenty-four hours. These reactions can all be followed under the polarizing microscope. The microscope further reveals that after hydration is complete, the calcium sulphate reverts to its original state, and from then on is but an inert constituent of the hardened cement. Such a substance which brings about a reaction, but does not enter as a combination into the end product, is termed a catalyst."

[2] Huber, Frederick W., Consulting Chemical Engineer.

### Effect of Water

Experience has demonstrated that water is one of the most important constituents of concrete, that concrete mixed too wet is subject to early decay, and that usually the greater the excess of water used in the mix the less the final strength of the concrete or neat cement grout. It therefore logically follows that if the hardening of cement is to be hastened, it is necessary to secure as a satisfactory catalyst one which will speed up the hydration, but will not affect injuriously the ultimate strength of the cement, greatly change its volume while setting, or have a corrosive effect on the casing with which it comes in contact. In order to obtain these results the catalyst must also act as a coagulator, thereby thickening up the cement grout so that it will set and harden normally, even with a considerable excess of water.

A publication of the U. S. Bureau of Standards[3] contains the following statement regarding the corrosive effect of calcium chloride in structural steel rods embedded in mortar containing this reagent for periods of from five to six years:

"While calcium chloride tends to corrode the reinforcement, the corrosion does not seem serious or of a progressive nature with age, in cases where the reinforcement is completely embedded in the concrete. However, when using accelerators care should be taken to completely coat and embed the reinforcement and avoid pockets near it."

Other experiments have been carried on by the manufacturers and users of quick hardening reagents which they claim demonstrate that the reagents in

[3] Technical News Bulletin No. 75. July 10, 1923.

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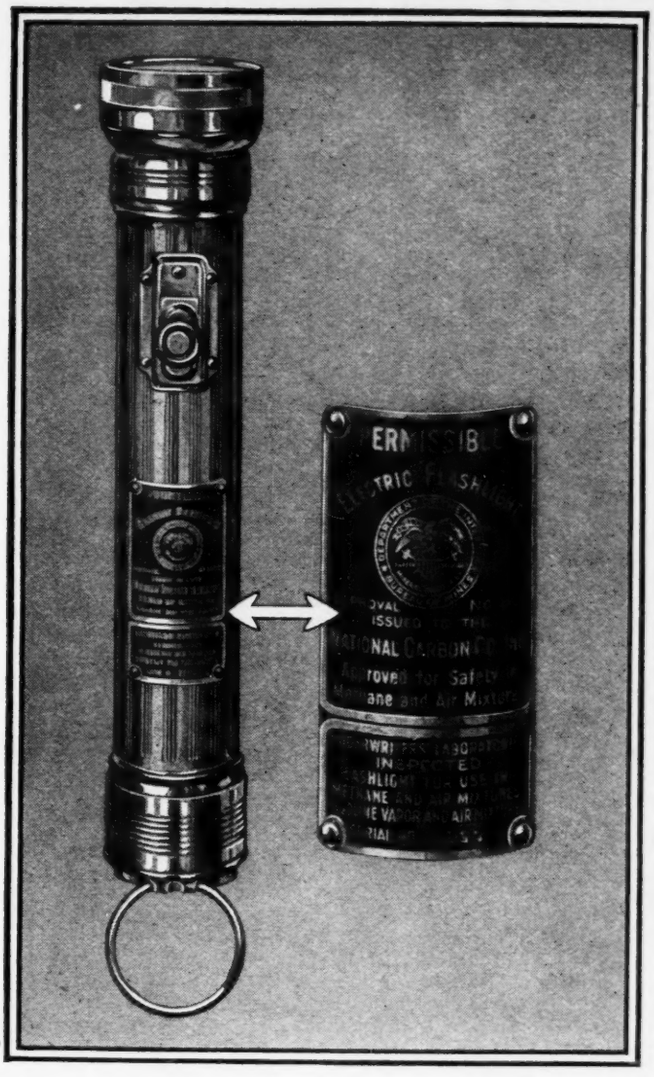

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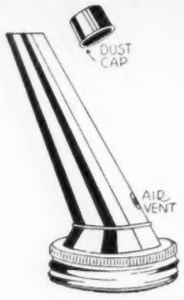


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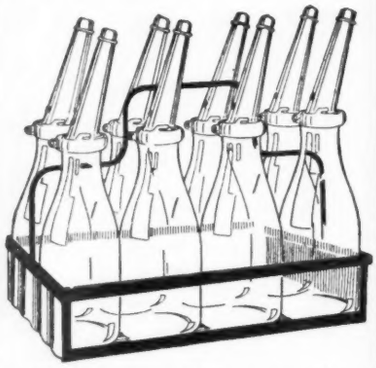

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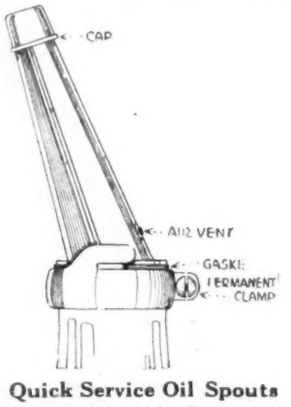


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general use satisfactorily fulfill the other above mentioned essentials, if used in the proper proportions.

### Quick Setting Cement and Chemicals

As already indicated, chemists and cement manufacturers have been aware that the addition of certain chemicals to cement would retard or accelerate its initial set and also hasten or slow down its hardening and increase or decrease its ultimate strength. However, so far as the writer knows, there is only one cement concern—the Atlas Lumnite Cemment Co.—which specializes on a hardening cement. This company outlines the introduction of this cement into the industrial field and gives its chief characteristics as follows:

"Atlas Lumnite cement is an alumina cement, similar to the French products, which were used in the construction of gun implacements during the World War. Since that time alumina cements in France have come into a very general use for practically all purposes where Portland cement is ordinarily used. The demand for these cements in Europe has grown so rapidly that it can not be met by the mills manufacturing them.

"Lumnite cement is not quick setting It affords the usual ample time for mixing, transporting and pouring before stiffening, but after setting, its high early strength develops with great rapidity.

"The chief characteristic of Lumnite cement that would interest oil producers is its very high early strength. It develops a greater strength at twenty-four hours than that of Portland cement at twenty-eight days. Some time ago we made for the Haliburton Oil Cementing Co. some tests of Lumnite cement in comparison with Portland cement, using 40 pounds of water to a bag of cement. These tests indicated the strength of Lumnite cement at twelve hours to be 35 per cent greater than that of Portland cement at ten days. This early strength permits of the resumption of drilling operations within one day after cementing the casing.

"Besides the advantages of the high early strength of Lumnite cement, it is considerably more plastic, or flows more readily than does Portland cement, on account of very much finer grinding and a greater colloidal content. This facilitates the filling of all voids surrounding the casing and the impregnation of sand and gravel."

The company states that considerable quantites of this cement have been used for cementing oil well casings in Oklahoma and in foreign fields.

### Use of Chemicals

The Santa Cruz Portland Cement Co. has the following to say about the use of chemicals in oil well cement:

"During the past three years a large number of experiments have been made covering a large variety of accelerators, including calcium chloride, which were believed might find application with slurrified cements for shutting off water in oil wells.

"With the exception of calcium chloride all of the accelerators experimented with have had deleterious effects in some form or other which would bar all recommendations for use. Calcium chloride, however, has responded favorably in practically every instance surrounding the conditions arising in oil wells, when used judiciously.

"Among the conditions considered in the calcium chloride experiments, those relating to rate of acceleration, degree of acceleration, time required for mixing and depositing, rate of hardening, quantity required for maximum results, effectiveness in mixing, effect upon well waters and pipe, batch locations for maximum effect at minimum resistance, have been given preference.

"The result in judicious application of $CaCl_2$ has been favorably effective in each of the above particulars and therefore adapts itself favorably for use.

"Best results are obtained by using calcium chloride equal to 3 to 3¼ per cent of the weight of the cement. When compared with our oil well cement without the use of accelerator the degree of hardening for the same periods showed an increase as follows:

| In a 40 per cent slurry | In a 50 per cent slurry |
|---|---|
| 24 hours— 97.5 per cent increase | 143.5 per cent increase |
| 3 days — 45.8 per cent increase | 37.0 per cent increase |
| 7 days — 16.3 per cent increase | 32.2 per cent increase |
| 14 days — 10.0 per cent increase | 0.9 per cent decrease |
| 28 days — 3.7 per cent increase | 21.4 per cent decrease |

"In the presence of an excess of water equal to 50 per cent, the increase in the degree of hardening is confined to the twenty-four-hour, three and seven-day periods, and thereafter there is a loss of strength.

"In a 40 per cent slurry, however, the rate of increase is constant to and including the twenty-eight-day period, but the rate of acceleration in twenty-four hours is not so rapid.

"It has been found that a 40 per cent slurry containing calcium chloride equal to 3¼ per cent of the weight of the cement afforded a strength, compressive or tensile in twenty-four hours, very nearly equal to what the same cement without $CaCl_2$ afforded in three days. That of the three-day period with $CaCl_2$ was almost as strong as that of the seven-day period without $CaCl_2$; and that of the seven-day period with $CaCl_2$ was almost as strong as that of the twenty-eight-day period without $CaCl_2$. In the case of a 50 per cent slurry containing $CaCl_2$ equal to 3¼ per cent of the weight of the cement, the strength in the twenty-four-hour period was a little over half as strong as that of the seven-day period without $CaCl_2$. That of the three-day period with $CaCl_2$ was equal in strength to that of the seven-day period without $CaCl_2$ and that of the seven-day period with $CaCl_2$ was considerably lower than that of the twenty-eight-day period with $CaCl_2$.

"It may be definitely noted that the degree of strength is entirely dependent upon the strength of cement originally used; following, that a cement of rapid

early hardening and of high strength will similarly be stronger for the periods named when used with the accelerator."

### Accelerators are Used

The other cement companies have usually been content to manufacture a very high and uniform grade of cement for oil well purposes, leaving the user to add any reagent which he believed would increase the effectiveness of the cement.

The quick hardening of these cements is obtained by the addition of certain accelerators. The usual action of such accelerators is to hasten the stiffening process known as "set," and also to increase the strength at the early ages. The effect of these accelerators is thus generally carried beyond the setting point. The following is a partial list of those now on the market:

Chlorides of Calcium, Barium, Strontium or Aluminum, and the Carbonate and Bicarbonate of Sodium. These mainly compose the chemicals known as Huber & Wilson's Reagent, Quick Hardening Chemical (largely Calcium Chloride and commonly known as the McDuffie reagent), the Mojave Reagent, a liquid made from materials obtained in the Mojave Desert by P. A. Wheeler of Whittier, California, and the material known by the trade name of "Konset." The chemical analysis of this last compound is given by its manufacturer as:

| | |
|---|---|
| Lime and soluble material | 78.10% |
| Fatty acids | 5.65% |
| Ammonia | 2.58% |
| Magnesium flo-silicate | 10.07% |
| Loss on ignition | 3.00% |

### Five in General Use

Five of these reagents are in general use in California oil fields and the percentage of the reagent added to cement is about as follows:

1. Calcium Chloride, a salt, purchased in bulk and dissolved in water before mixing with cement. The usual proportion is 100 lbs. to 20 or 25 sacks of cement.
2. "Cal," a powder sold in 100 lb. sacks, usually mixed dry with cement before water is added. Proportion, 100 lbs. to 20 sacks cement.
3. Huber & Wilson Reagent, a liquid sold in five gallon cans, one five gallon can being added to each 40 sacks of cement.
4. "Konset," a liquid sold in five gallon containers. The Konset is added to the mixing water in proportions of one gallon Konset to ten gallons of water. The proportion is about one gallon of Konset to about 4 sacks of cement.
5. Quick Hardening Chemical, in the form of rock salt put up in 3 lb. sacks. One sack of the reagent for each sack of cement is dissolved in the cement mixing water before the cement is mixed.

As noted above, there is one other reagent used to a limited extent. This is known as "Mojave Reagent," a liquid, put up in 25 to 50 gallon containers. A quart of the liquid is used to each sack of cement.

All the larger companies operating in California, with the exception of Union

"Big Gas Sales" Go To

that service-station which has a "front". No form of advertising adds more liveliness than—

*By Day*, the clear bold "call" of a Flexlume glass-letter sign;

*By Night*, the same display with its glowing letters of light.

Highly effective advertising, because more quickly noticed and more easily read from a distance; very economical, because its beauty and operation are permanently insured by features of construction and finish, exclusively Flexlume.

Do you wish for increasing patronage and profit? Write for free sketch and information about a Flexlume sales-building sign for your station

*We also build exposed lamp and other types of electric signs for those who prefer or require them.*

FLEXLUME CORPORATION
1120 Military Road Buffalo, N. Y.
*Phone "Flexlume" — All Principal Cities*
Factories also at Detroit, Los Angeles, Oakland, Calif. and Toronto, Canada

FLEXLUME CORPORATION

JUST AS EFFECTIVE BY DAY

UNIVERSAL

Cincinnati Advertising Globes

Always Look New

There is nothing to wear off, rub off or otherwise deface the cheerful countenance of a Cincinnati Advertising Globe Face.

The lettering and design are as permanent as the glass itself—because the coloring matter is really a ceramic (glass) material which is fused with the globe face under terrific heat.

Permanency is one of the factors that makes Cincinnati Advertising Globes the lowest priced globe you can buy.

The CINCINNATI ADVERTISING PRODUCTS COMPANY
York & Colerain Ave.
Cincinnati, Ohio

4 Points!

1. Glass Colors Fired In. As permanent as the glass itself—more brilliant than paint.
2. Scientific Annealing Process. Anti-Breakage insurance.
3. Delivery When Wanted. Any quantity.
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## MOTOR OIL

100% OIL 100%

100% PURE PENNSYLVANIA OIL

*The highest grade oil in the world*
*Permit No. 55*

**Just What You Must Have**

ONE FAIR TRIAL of CORECO will PROVE THAT CORECO MOTOR OILS MERIT the demand of the consumer who uses only the most efficient, dependable and the best lubricating oils. To the JOBBER a revelation. YOU will double your profits. WHY? The price low—specifications high. We can make anything you want. Write, wire or telephone your order.

**CONTINENTAL REFINING CO., Oil City, Pa.**

*Leader*

# Strength Woven in Steel *and* Guaranteed Leakproof

A guarantee may mean much—or nothing. We are proud of the fact that this organization is big enough and sincere enough to stand squarely back of every truck tank that bears the LEADER name plate.

***Bulletin 500 will tell you more of Leader truck tanks. Send for it.***

**LEADER IRON WORKS, *Decatur, Illinois***

2112 NORTH JASPER

Oil Co. of California and North American Oil Consolidated, use one of these reagents in at least a portion of their cement jobs. Details of the practice of several of the largest operators in the state are as follows:

Associated Oil Co. uses Quick Hardening Chemical, Konset, or calcium chloride, in cementing water strings and practically all other cement jobs. Where less than 100 sacks of cement are used it is all treated. Where more than 100 sacks are used, only the last 75 or 100 sacks are treated. The usual practice in water strings is to drill out the cement on the fourth or fifth day. The reagents are used in the following proportions:

Quick Hardening Chemical; 3.1 lbs. per sack of cement.

Konset; ½ gallon per sack of cement.

Calcium chloride; 2.35 lbs. per sack of cement.

California Petroleum Corp. uses Quick Hardening Chemical in cementing practically all water strings, about 2½ pounds of the reagent to the sack of cement. Where 300 or 400 sacks of cement are used in a cementing operation the last 100 or 150 sacks are treated with the reagent. In re-cement jobs the reagent may or may not be used depending on the depth of the water string and the pressure required to force out the cement. If the water string is long and a high pressure is required in a re-cement job the reagent is not used on account of the danger of cementing the tubing in the well. The usual practice is to drill out cement in a water string after standing about four days.

Chanslor-Canfield Midway Oil Co. uses the Huber & Wilson reagent. It is customary to treat all the cement where 40 to 100 sacks are used. When several hundred sacks are used only the last 100 or 150 are treated. The usual amount of the reagent used is five gallons to 40 sacks of cement. The practice is to drill out after cement has stood about ten days.

### General Petroleum Practice

General Petroleum Corp. cements practically all rotary drilled holes by the Perkins method using Quick Hardening Chemical. All the cement is treated if 100 sacks or less are used. When 200 to 400 sacks are used it is customery to treat the last 100 sacks. When the dump bailer method is used to cement in cable-tool drilled holes, it is not the regular practice to treat the cement, although in some cases Quick Hardening Chemical or Cal have been used. This same procedure is followed in plugging operations. Cement in rotary drilled holes is usually allowed to set from three to six days before it is drilled out. Some quick hardening chemical is used in about 80 per cent of all cementing jobs. Four pounds of the chemical is used per sack of cement.

Honolulu Consolidated Oil Co. uses no quick setting chemical in cementing the casing above the gas zone in the Midway field. In cementing the water


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That's why the smaller filling stations that were never before regarded as large enough to rate a compressor are now putting in Kellogg Bearcats.

The Bearcat will answer all the free air problems of the smaller filling station and at the same time costs so little that no one can afford to be without it.

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Fully equipped.
Automatic Control.
12 x 36 tested tank.
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Leak proof rings.
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Nickel steel crankshaft.
Rigid inspection.
Fully guaranteed.

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**Rochester, N. Y.**

**KELLOGG COMPRESSORS**

# BLACKMER ROTARY PUMPS

Dominates the field in transferring oil and gasoline.

Capacities from 3 G. P. M. to 500 G. P. M. hand or power operated.

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1347 Book Bldg., Detroit, Mich.
408 Austin St., Houston, Texas.
4025 Boulevard Place, Indianapolis, Ind.
1505 Commerce Bldg., Kansas City, Mo.
1320 Starks Bldg., Louisville, Ky.
429 Broadway, Milwaukee, Wis.
549 Plymouth Bldg., Minneapolis, Minn.
306 Wells Fargo Bldg., New Orleans, La.
71 Murray St., New York, N. Y.
904 Real Estate Trust Bldg., Philadelphia, Pa.
711 Ferguson Bldg., Pittsburgh, Pa.
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Are explained in a concise, practical way in OIL FIELD PRACTICE, by Dorsey Hager, petroleum geologist and engineer.

It is written for the business man, the oil field driller and operator, the geologist and the investor.

You may obtain this book containing 310 pages and 98 illustrations by mailing check for $3 to—

**National Petroleum News**

820 Caxton Building — Cleveland, Ohio


string above the oil zone about 300 sacks of cement are used, all treated with the Mojave Quick Setting Reagent. About one quart is used per sack of cement. The general practice is to drill out on the fourth day.

Pacific Oil Co. uses Konset in cementing all water strings. The amount of cement varies from 150 to 500 sacks. One quart of Konset is used for each sack if not more than 300 sacks is used. If more than 300 sacks of cement are to be used only the last 300 are treated, and cement is drilled out on the fifth day. One quart of Konset to each sack of cement is also used in all concrete and cement plugging operations.

**Pan-American Method**

The practice of Pan-American Petroleum Co. and Petroleum Securities Co. in the use of quick setting reagents is as follows:

1. Quick Hardening Chemical is used in all cement jobs, when the Perkins Oil Well Cementing Co. does the cementing, on the surface or conductor strings of casing. Konset is used when the Hamer Oil Well Cementing Co. does the cementing or plugging jobs through drill pipe or tubing. Calcium chloride is used where plugs have been placed with the dump bailer or in canisters.

2. Quick Hardening Chemical is mixed with water, so that the specific gravity of the solution is 1.020 to 1.025. This requires about 3 lbs. of chemical per sack of cement. Konset is mixed directly with the grout and the amount used depends entirely on the job; that is, whether pressure is to be applied, or upon the time allowed for the placing of the cement. The amount varies from ½ gallon to 1 gallon per sack of cement.

3. In cementing conductor and water strings the reagent is mixed with the last 100 sacks. In plugs, reagent is used with all of the cement.

4. The set cement is drilled out of the water strings on the fourth day.

Shell Co. of California uses Quick Hardening Chemical in all original cementing of strings of casing and in most re-cementing and plugging operations. The amount of the reagent used is determined by dissolving it in the mixing water until the specific gravity of the water has been raised to about 1.018. About 3 pounds of the chemical to 1 sack of cement gives the required strength. The cement is all treated if not more than 300 sacks are used. Where a larger amount of cement is used only the last 200 or 300 sacks are treated.

This company has also used, with success, the quick hardening cement, "Lumnite," on some re-cementing, combination string cementing, and plugging jobs. No chemicals are, of course, used with this cement. The cement is usually drilled out of water strings on the fourth day.

Standard Oil Co. of California uses calcium chloride as an accelerator in cementing most of its water strings, the proportion being about 2½ pounds of the reagent per sack of cement. Where a large amount of cement (300 or 500 sacks) is used, only the last 100

sacks or less are mixed with the quick hardening chemical. The cement in water string is usually drilled out in about seven days.

Union Oil Co. of California up to the present time uses no quick setting reagents. The reasons are given in a letter to the writer from F. F. Hill, manager of field operations, reading in part as follows:

"It is my opinion that any reagent that will start coagulation will not permit you to get the mix down the hole and up the back of the pipe in the time that is usually required to do this kind of a job successfully, particularly at extreme depths, that are now being drilled.

"To use reagents you must add more water to the mix for the purpose of retarding the initial set, and naturally the more water you have in the mix the longer it is going to take to set and the more chance you have of failure.

"It has been our experience that when any good grade of cement is placed properly in the well and the pipe is landed in a suitable formation there is no difficulty in obtaining a shut-off.

"We have proven by experiments that if one enters a cemented well within forty-eight hours after cementing he would probably have the water shut off, if it was ever going to be shut off, and could go ahead drilling just as well as if he had waited ten days or two weeks.

The average oil well cement will take its initial set in from one to two hours time. Within a few hours thereafter the cement will be hard enough to resist any movement of fluid; so unless one is depending on the compressive strength of cement to make a shut-off where only a few feet of wall surface are available there is little reason to wait for a greater hardness to take place.

"Any cement manufacturer will make a cement to take any kind of an initial set required so we can see no use of trying to improve on their work.

"If we get a good cement, land the casing in suitable formation and handle the cement properly in mixing and pumping back of the casing no trouble should be experienced in making a shut-off."

### Success of Cementing Operations

A summary of 323 cementing operations in the fields of western Kern county in the year of 1924 shows the following results:

| | |
|---|---|
| Number of wells cemented with ordinary cement | 91 |
| Number of failures of cement jobs | 12 |
| Per cent failures | 13.2 |
| Number of wells cemented using a quick-setting reagent | 232 |
| Number of failures of cement jobs | 10 |
| Per cent failures | 4.3 |

When the quick setting reagents first came into use, numerous instances were recorded where tubing was cemented in wells or a large amount of cement was left in the casing at the conclusion of the cementing operation. In a few cases even, the cement set in the dump bailer where this method of placing the cement was used. However, with a better knowledge of the action of the quick setting reagent and after additional experience in the

(Continued on Page 96)


## Buying a Pig in a Poke

Buying gasoline, kerosene or other petroleum products is much like "buying a pig in a poke"—as they used to say; you never know just what kind of a hog you have acquired until you open the sack; nor what kind of gasoline you have purchased until it is in your customer's cars, **unless you stick to a refiner whose products are above question.**

When you order "White Eagle" Gasoline or Kerosene, it isn't necessary to add a long list of specifications. There is only one kind of "White Eagle" Gasoline or Kerosene. It is clean, pure, uniform and always as represented. It has built business for us, throughout nine states of the Middle West and it will build business for you. You buy known quality when you buy White Eagle goods.

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**Oil and Refining Company**
SALES OFFICES
ST. PAUL — KANSAS CITY — FT. WORTH

## Results——Results——Results
### Classified Advertising

Let just one of our advertisers tell you what his advertising accomplished. "We have had 27 replies to our advertisement." The writer further says "It was an unusually good class that answered this advertisement and replies were received from as far north as Saskatoon, and west to the Pacific Coast."

***Write us today about your advertisement.***

**National Petroleum News**
812 Huron Rd. Cleveland, Ohio

Dependable Source of Supply

From the Oil Well to the Jobber

# Motor Oils and Tractor Oils

made with

Means
- More Power
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- Less Carbon
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- Complete Satisfaction

Samples—Light—Medium—Heavy and Extra Heavy sent upon request.
We can ship in compartment cars.
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## Barnsdall Refining Company

Subsidiary Barnsdall Corporation

624 South Michigan Avenue
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From the Oil Well to the Jobber

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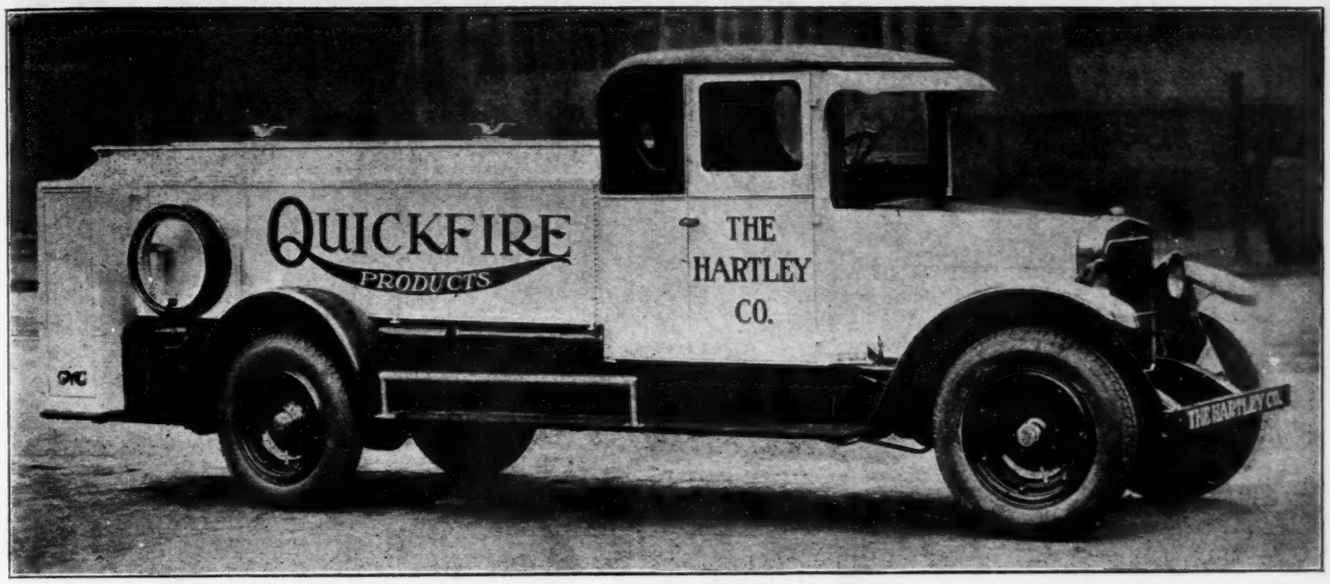



*GMC 1½-ton chassis with especially designed tank and cab, built for The Hartley Co., Cambridge, O.*

# Tank Truck Does Advertising Duty For Eastern Ohio Jobber

CLEVELAND, Feb. 27.—Tank trucks that impart an air of quality and serve as traveling billboards seem to be growing in favor among many oil companies. It was with the publicity idea in mind that the Hartley Co., Cambridge, O., recently had built an unsually attractive tank truck for service in its territory in east central Ohio.

The equipment was built by the General Motors Truck Co.'s Cleveland branch. A big 1½-ton chassis was used and on it was mounted a two-compartment 500-gallon riveted tank.

The tank compartments are of 200 and 300 gallons capacity. The can box on the rear is divided into four compartments, the upper half being designed for packaged oils and greases. At each side of the lower half are spaces for 10-gallon cans to be used in bucketing deliveries and in the center are the two outlet lines for the tank compartments. The baseboard in the center compartment is hinged so that it may be swung out of the way in case an unusually high bucket is used. The hose is carried out of sight in two 4-inch tubes that run lengthwise of the truck under the tank. To do this no cross sills were used under the tank.

The can racks are on the running board and the cans are held in place by brass rails. Three or four cans, depending on the size, may be carried on each running board. By placing the racks so low the sides of the tank are exposed to full view for advertising purposes. The spare tire carrier is at the rear of the right side of the tank.

The height from the ground to the center top of the tank when unloaded is 68 inches. The filler caps of the tank rise a few inches above the center. The caps as well as the railings that run along each side of the tank top are brass plated.

The cab is of deluxe type, leather upholstered and compares with the coupe type of passenger cars. The tank, can box, cab body and hood are painted ivory and the disc wheels, fenders and apron red. All lettering is red. The top and back of the cab are black leather.

The can box is enclosed. The door of the upper half swings upward and is provided with a clip fastener. The lower half has two doors which swing to the sides. When closed they are secured with a heavy lock.

Across the upper doors is painted the company's gasoline trade mark, "Quickfire, High Test", the same design as is on the sides of the tank. Across the lower doors is painted, "Petroleum Products, The Hartley Co., Cambridge, O." The company's name is painted on the lower panels of the cab doors and on the front bumper.

The job cost $4350 or about $500 more than the ordinary equipment would cost. The $500 is charged up to advertising and W. H. Hartley, one of the partners in the Hartley Co., said he regarded that as a lower figure than the firm would have to pay for an amount of billboard space that would give the same volume of publicity.

## W. P. R. A. Compiling 1926 Edition of Map

TULSA, Feb. 27.—The new edition of its refinery map, 65 by 37 inches, published by the Western Petroleum Refiners Association, will be ready for distribution within a few weeks. The map will show the geographical location of all oil refineries as of Jan. 1. of this year, and also define the extent of the marketing territories for refined products, according to a recent bulletin of the association.

A feature of the map will be an index of all refineries, giving the names of companies operating the plants, towns at which plants are located, the daily capacity for crude; whether the plant is equipped with cracking facilities, whether it is operating or not, and the group in which the operations of the refinery are included in the monthly reports of the Government.

Members of the association will receive the map free of charge, but to non-members there will be a charge of $2 each. Requests for a copy of the map should be mailed to the association as early as possible.

GREENWOOD, MISS.—Seven-Eleven Tire & Accessory Co. had installed two additional storage tanks at its plant here. One is a two-compartment 22,000 gallon gasoline tank and the other is a four-compartment 16,000 gallon lube oil tank. This gives the company a total storage capacity of 135,000 gallons. Another truck has also been added, which makes five in operation, according to W. S. Cooper, secretary and treasurer.

WHY?

"DEFIANCE"

—because the men in back of the Defiance Steel Barrel have pledged themselves to make the best barrel that it is possible to build.

—because there is a type of Defiance Steel Barrel to fit your every need.

—because you can get Defiance Steel Barrels when you want them, due to adequate production and storage facilities.

—because you always get your money's worth in a Defiance Steel Barrel.

Give them a trial and you will always use Defiance Steel Barrels.

**The American Steel Package Co.**
**Defiance, Ohio**

**THE GEOLOGY OF PETROLEUM**

is the name of the book written by William H. Emmons, which goes into detail describing the more important fields such as the Appalachian, Lima-Indiana, Illinois, Mid-Continent, Gulf Coast of Texas and Louisiana, Rocky Mountain, Canadian, Mexican and foreign fields.

It contains 610 pages, with 254 maps and illustrations, and may be purchased for $6 from—

**National Petroleum News**
**824 Caxton Building** **Cleveland, Ohio**

## Wisconsin's Q. D. A. Probe Halted for a While

Staff Special

MADISON, WIS., Feb. 27.—The investigation of the Standard Oil Co.'s quantity discount agreements has been discontinued in Wisconsin for a while at least. Four hearings were held to determine the effect of these contracts on prices and marketing conditions in this state during the second week in February, and other hearings were to have been held regularly for a while in Madison but more important state business has interfered.

The hearings were presided over by Commissioner of Markets, Edward Nordman, for it was under the provisions of the department of markets law that the state proposed to attack the fairness of the Q. D. A. Examination of witnesses was conducted by Herman L. Ekern, state's attorney. Hearings were held at Madison, Eau Claire, Appleton and Milwaukee respectively on Feb. 8, 9, 10 and 11. Probably no further hearings will take place before the middle of March, it has been predicted.

## Meet Despite Heavy Snow

GRAND RAPIDS, MICH., Feb. 27.—Driving 50 miles through a heavy snow storm to attend a district oil jobbers' meeting was what some of the members of the Tri-County Petroleum Club faced to arrive at Vassar, Mich., where the meeting of the club was held. About a foot of snow had fallen by 7 o'clock P. M. when oil men began coming in, according to James A. Gilmore, secretary of the Michigan Independent Oil Men's Association, with headquarters here. Thirty oil men attended.

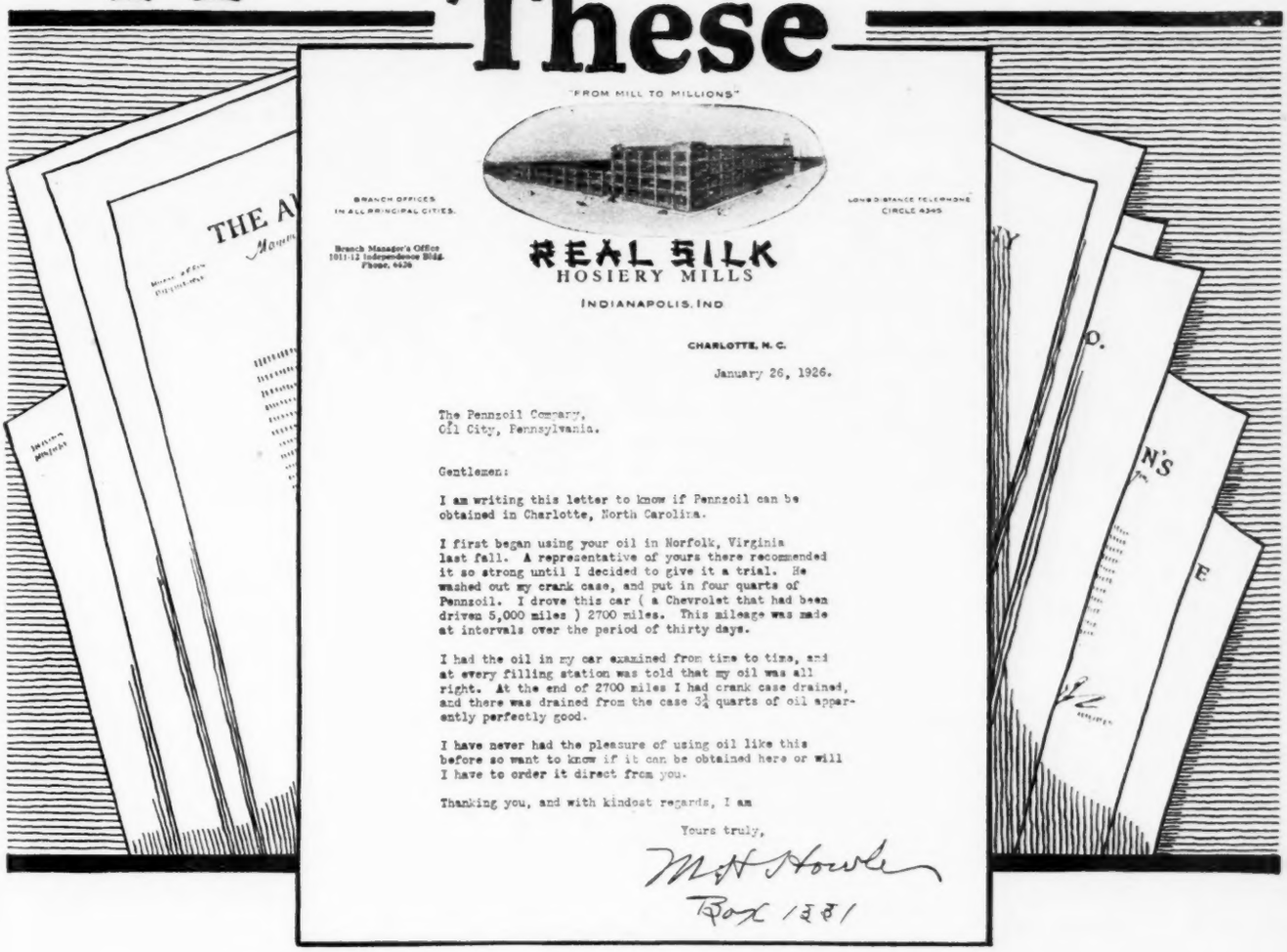
The curtailment of long-term credits was the main topic of discussion. The subject will be taken up again at the next meeting on March 18 at Pigeon, Mich.

MIAMI, FLA.—The gasoline and oil business in Dade county, in which Miami is located, has more than doubled in the past year, according to H. O. Shaw, of Shaw Bros., distributors for products of the Sun Oil Co., Philadelphia.

The state tax on gasoline now amounts to approximately $250,000 per month, or $3,000,000 per year from this county alone, Mr. Shaw states.

HOUSTON, Feb. 27.—Gilbert A. Geiger, for seven years connected with the Gaylor Oil Co., bulk distributors at Houston, has resigned to become special representative of the Marland Refining Co. at Texas City, Texas. Mr. Geiger, who will handle tank car and contract sales at Texas City, is working in conjunction with F. E. Miller in charge for Marland at that point.

# Are You Missing Opportunities Like These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BRANCH OFFICES IN ALL PRINCIPAL CITIES.
LONG DISTANCE TELEPHONE CIRCLE 4345
Branch Manager's Office 1011-12 Independence Bldg. Phone, 4626
REAL SILK
HOSIERY MILLS
INDIANAPOLIS, IND
CHARLOTTE, N. C.
January 26, 1926.
The Pennzoil Company,
Oil City, Pennsylvania.
Gentlemen:
I am writing this letter to know if Pennzoil can be obtained in Charlotte, North Carolina.
I first began using your oil in Norfolk, Virginia last fall. A representative of yours there recommended it so strong until I decided to give it a trial. He washed out my crank case, and put in four quarts of Pennzoil. I drove this car ( a Chevrolet that had been driven 5,000 miles ) 2700 miles. This mileage was made at intervals over the period of thirty days.
I had the oil in my car examined from time to time, and at every filling station was told that my oil was all right. At the end of 2700 miles I had crank case drained, and there was drained from the case 3¼ quarts of oil apparently perfectly good.
I have never had the pleasure of using oil like this before so want to know if it can be obtained here or will I have to order it direct from you.
Thanking you, and with kindest regards, I am
Yours truly,
M H Howle
Box 1381

**GIVE a moment to reading this letter. Did you ever see anything more enthusiastic? And doesn't oil that will create such enthusiasm make a wonderful selling proposition? Quality—sheer quality—is building Pennzoil demand. This demand is being stimulated and strengthened by Pennzoil national advertising. It is reaching 10,000,000 motorists this year. Think it over. Are you overlooking a bet?**

THE PENNZOIL COMPANY · *Oil City, Pa.* · *Buffalo* · *Los Angeles*
*Refinery:* Oil City, Pa.

SUPREME PENNSYLVANIA QUALITY

PENNZOIL

SAFE LUBRICATION

GULF
Refining
Company

*General Sales Offices*
**PITTSBURGH, PA.**
*District Sales Offices*
**New York, Houston, Atlanta, Boston, New Orleans, Tampa, Philadelphia**

**REFINERS OF OKLAHOMA TEXAS AND LOUISIANA**

**PETROLEUM**

**REFINED OIL**
**GASOLINE**
**NAPHTHA**
**GAS OILS**
**PARAFFINE WAX**
**ASPHALT**

**Fuel Oil--Lubricating Oils**

**CYLINDER ENGINE CORDAGE**

**RED AND PALE PARAFFINE OILS**

(Continued from Page 91)

handling of the cementing operations these difficulties have been largely overcome. Probably the speed of carrying out the cementing operation has been the largest factor in securing successful cementing operations where the reagents are used. A cementing job which a few years ago required two or three hours is now completed in from one to one and one-half hours. Mechanical cement mixers capable of mixing cement at a rate as high as ten sacks per minute, and the rapid displacement of the cement in the casing by mud fluid, are the two important factors in securing this shortening of time required to place the cement.

## Sealy, Head of Magnolia, Dies in France

HOUSTON, Feb. 27.—John Sealy, chairman of the board of the Magnolia Petroleum Co. and head of the Galveston banking house of Hutchings, Sealy & Co., died Feb. 19, in Paris, according to cable information reaching Galveston.

According to estimates of friends, Mr. Sealy, who had been in ill health for about a year, possessed a fortune in the neighborhood of $100,000,000 of which some $15,000,000 was in oil properties. He inherited considerable Texas property from his father. He increased his holdings until at the time of his death he was reputed to have more than 1,000,000 acres of Texas land listed in his name, making him the largest individual landowner in Texas.

Mr. Sealy was 56 years old and unmarried. Besides his connection with the Magnolia and with the Galveston banking house, he was a leading figure in the Galveston Wharf Co., a director of the Gulf, Colorado & Santa Fe Railroad and was intimately interested in a number of Texas industries. He was a graduate of Yale University.

In 1907 the state of Texas brought suit to oust the Standard Oil Co. from the state and the court sustained the suit. The Standard's property was sold at court sale to Mr. Sealy in 1911. He reorganized the property into the Magnolia Petroleum Co. On Nov. 25, 1925, the stockholders of the Magnolia voted to merge it with the Standard Oil Co. of New York.

Mr. Sealy leaves a brother, George, an unmarried sister and another sister, Mrs. Waverly Smith. Her husband was associated with Mr. Sealy in the Magnolia Petroleum Co.

Mr. Sealy sailed for Europe last November after the details of the merger of the Magnolia with the Standard of New York had been worked out. Before he sailed he had confided to close friends that he feared his days were numbered, due to the ravages of malignant carbuncles with which he was afflicted.

About a month ago he went to Paris for treatment. His death was a surprise to his friends and associates.

# Union Oil of California Maintains Net Profits Above 11 Per Cent

CLEVELAND, March 1

UNION Oil Co. of California in 1925 virtually maintained its 1924 rate of earnings. Net profits averaged $2.78 a share or more than 11 per cent on the 3,780,249 shares, par $25.00 each, outstanding at the end of the year as compared with $2.83 a share on 3,780,000 shares outstanding at the end of 1924.

Profits from operations in 1925 amounted to $27,082,279, a decline of $251,753 from the 1924 profits but net profits after depreciation, depletion, interest and all taxes amounted to $10,513,206, a decline of only $190,842. General charges were decreased due to the cancellation of the employes' profit sharing plan last July 1 but the company increased its contribution to the provident fund by $163,856. Provision for depreciation, depletion and cost of new drilling was increased $130,912 over the 1924 allowance.

### Production Slightly Lower

Production of the company amounted to 14,574,408 barrels and of controlled companies to 378,358 barrels, as compared with 14,658,594 and 378,358 barrels, respectively, in 1924. The aggregate decrease in 1925 was 75,487 barrels. On the day the report was published, Feb. 8, 1926, daily average production was 41,000 barrels from 617 wells. The company had shut in at that time 157 wells with a potential daily production of 13,000 barrels. It was buying about 51,000 barrels of crude daily. The company's production, purchases and other receipts amounted in 1925 to 33,656,594 barrels or about 14⅔ per cent of the total oil produced last year in California, President W. L. Stewart stated in his report to stockholders.

Development work last year, Mr. Stewart said, was principally in the Rosecrans and Dominguez fields of California and the Wellington-Fort Collins area of Colorado. However, test wells were drilled in the Los Angeles Basin, and San Joaquin valley of California and in Wyoming and New Mexico. In Wyoming the company discovered the Lake Creek pool.

At the end of the year the company held in fee 616,429 acres and under lease 174,622 acres as compared with 619,506 acres in fee and 182,871 acres under lease at the end of 1924. California and Colorado acreage was increased last year but 3,840 acres in British Columbia were disposed of.

The company increased its storage facilities by a half million barrels and on Dec. 31, 1925, could care for 33,000,000 barrels of oils. Additions also were made to the pipe line system particularly in the Los Angeles Basin and at the end of the year had 504 miles of truck lines and 343 miles of gathering lines. The combined maximum capacity of the system was 275,000 barrels daily.

During the year $1,209,606 was spent on additions to refineries and natural gasoline plants. The normal daily capacity of the refineries was 90,000 barrels of crude a day and the gasoline plants 90,000,000 cubic feet of gas a day at the end of the year.

Marketing facilities were increased by 24 bulk stations and 39 service stations and the organization of the Union Oil Co. of Mexico to distribute Union products in that country. At the end of the year the Union's marketing equipment consisted of 303 foreign and domestic sales stations and commission agencies, 423 service stations, 608 tank cars, 1048 motor trucks and 856 other automobiles. The marine equipment consisted of 13 steamships, 21 barges and motor boats having a total carrying capacity of 960,700 barrels.

Gross sales for the year amounted to $74,378,772, an increase of $8,428,554 over 1924. The increase was due chiefly, Mr. Stewart said, to increased cargo shipments of gasoline and gas oil to Atlantic seaboard ports and to Europe, and kerosene to China. Fuel oil sales fell 12 per cent in value. Sales of all products totaled 26,863,475 barrels as compared with 29,342,936 barrels in 1924, and 2,188,912 barrels of fuel oil were delivered against receipts of refinable crude as compared with 2,038,086 barrels in 1924.

### Current Assets Increased

Current assets on Dec. 31, 1925, were $55,002,014, including $13,893,349 cash and United States securities, and 7 to 1 more than current liabilities. The increase in current assets during the year amounted to $6,993,239 and current liabilities decreased $1,159,541.

Inventories on Dec. 31, 1925, were more than $3,000,000 above the Dec. 31, 1924 inventories and in volume were 3,401,348 barrels larger. Valuation carried in the books was less than the true market value, Mr. Stewart reported.

On Dec. 31 there were 6,428 stockholders exclusive of Union Oil Associates stockholders, of whom there were 3,866, as compared with 4,960 the year before. Eighteen hundred and forty one employes subscribed to 20,818 shares of stock at $34 a share under the plan put into effect last year.

**Consolidated income accounts of Union of California and controlled companies for last five years follow:**

| | 1925 | 1924 | 1923 | 1922 | 1921 |
|---|---|---|---|---|---|
| Profits | $ 27,082,279 | $ 27,334,032 | $ 24,357,393 | $ 25,419,981 | $ 23,839,187 |
| Expenses, taxes, etc. | 4,392,099 | 4,415,712 | 3,237,115 | 3,691,023 | 4,676,932 |
| Operating income | $ 22,690,180 | $ 22,918,320 | $ 21,120,278 | $ 21,728,958 | $ 19,162,255 |
| Interest | 736,649 | 904,860 | 776,394 | 429,353 | 3,249 |
| Deprec., deplet., etc. | 11,440,325 | 11,309,412 | 12,311,235 | 10,563,730 | 8,630,799 |
| Net profits | $ 10,513,206 | $ 10,704,048 | $ 8,032,649 | $ 10,735,875 | $ 10,528,207 |

*Credit.

**Consolidated balance sheets of the Union of California and controlled companies as of Dec. 31 for the last five years follow:**

| | 1925 | 1924 | 1923 | 1922 | 1921 |
|---|---|---|---|---|---|
| **ASSETS** | | | | | |
| *Oil lands, leases | $ 95,572,755 | $ 95,300,637 | $ 94,246,744 | $ 55,592,832 | $ 33,096,035 |
| Wells and Development | 23,707,641 | 21,551,518 | 19,700,347 | 16,818,538 | 14,564,559 |
| Gasoline plants | 2,777,405 | 2,316,762 | 2,150,491 | 1,598,760 | † |
| Pipe lines, storage | 16,249,277 | 16,144,525 | 15,891,706 | 12,794,082 | 11,296,720 |
| Marine equipment | 13,488,366 | 13,508,301 | 13,699,172 | 12,868,972 | 11,410,108 |
| Refineries | 13,418,285 | 12,724,106 | 12,540,688 | 11,019,064 | 10,481,093 |
| Market stations | 22,004,833 | 20,464,422 | 17,829,717 | 14,432,793 | 12,200,100 |
| Total | $187,218,562 | $182,010,270 | $176,058,895 | $125,125,041 | $ 93,048,525 |
| Deplet., deprec. | 84,403,310 | 76,511,159 | 67,122,946 | 43,947,754 | 26,655,968 |
| Net property | $102,815,252 | $105,499,111 | $108,935,949 | $ 81,177,287 | $ 66,392,557 |
| Investments | 997,925 | 1,046,886 | 929,487 | 785,912 | 3,276,337 |
| Cash | 6,893,349 | 4,733,090 | 5,141,478 | 4,716,347 | 5,871,524 |
| U. S. certificates and bonds | 7,000,000 | 5,500,000 | 3,500,000 | 7,305,000 | 750,250 |
| Bills, accounts receivables | 7,581,566 | 6,945,342 | 7,457,829 | 8,478,917 | 5,043,389 |
| Crude, refined oil | 29,700,436 | 26,242,595 | 21,155,212 | 19,969,045 | 18,537,810 |
| Material, supplies | 3,826,663 | 4,587,747 | 4,997,806 | 4,537,628 | 4,096,159 |
| Deferred charges | 598,174 | 658,633 | 763,755 | 1,193,783 | 647,610 |
| Total | $159,413,365 | $155,213,405 | $152,881,516 | $128,163,921 | $104,615,637 |
| **LIABILITIES** | | | | | |
| Capital stock | $ 94,506,225 | $ 94,500,000 | $ 90,000,000 | $ 90,000,000 | $ 50,000,000 |
| Employes' stock subs | 514,225 | ..... | ..... | ..... | ..... |
| Bonds | 24,100,500 | 20,110,500 | 24,259,000 | 18,468,000 | 8,670,000 |
| Purchase oblig. | 495,822 | 962,402 | 1,520,402 | 563,206 | 565,295 |
| Accounts payable | 4,677,317 | 5,973,855 | 4,733,658 | 6,672,994 | 4,199,258 |
| Taxes, etc. | 3,066,251 | 2,976,993 | 2,206,787 | 2,224,963 | 4,086,661 |
| Accrued interest | 353,424 | 305,684 | 372,941 | 270,184 | ** |
| P. & L. surplus | ‡31,124,430 | 29,794,173 | 29,131,994 | 9,222,680 | 11,317,141 |
| Marine insurance, etc. | 575,172 | 589,798 | 656,734 | 741,893 | 777,280 |
| Appropriated surplus | ..... | ..... | ..... | ..... | 25,000,000 |
| Total | $159,413,365 | $155,213,405 | $152,881,516 | $128,163,921 | $104,615,637 |

*Does not include $22,562,091 appreciation of new discovery areas brought in as producing territory subsequent to March 1, 1913, less depletion to Dec. 31, 1925, values of which have not been agreed upon with the internal revenue bureau.

‡Includes $15,334,455 appreciation of new discovery areas values of which have been agreed upon by internal revenue bureau.

**Included in taxes and other expense accounts.

†Included with refineries.

# Refinery Products Directory

## GASOLINE AND NAPHTHA

OKLAHOMA

**56-58 450 E. P. Gasoline**
★Bolene Refg. Co., Enid, Okla.
**58-60 450 E. P. Gasoline**
★Bolene Refining Co., Enid, Okla.
**58-60 U. S. Motor Gasoline**
★Bolene Refg. Co., Enid, Okla.
**64-66 390 E. P. Gasoline**
★Bolene Refining Co., Enid, Okla.
**64-66-375 E. P. Gasoline**
Altitude Petroleum Co., Tulsa, Okla.

PENNSYLVANIA

**50-52 Naphtha**
Emery Mfg. Co., Bradford, Pa.
**54-56 Naphtha**
Emery Mfg. Co., Bradford, Pa.
**58-60 Straight-run Gasoline**
Emery Mfg. Co., Bradford, Pa.
**60-62 Straight-run Gasoline**
Emery Mfg. Co., Bradford, Pa.
**62-64 Straight-run Gasoline**
Emery Mfg. Co., Bradford, Pa.
**64-66 Straight-run Gasoline**
Emery Mfg. Co., Bradford, Pa.
**68-70 Straight-run Gasoline 305-320 E. P.**
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.
**70-72 Straight-run Gasoline 300-305 E. P.**
Emery Mfg. Co.. Bradford, Pa.

## NATURAL GASOLINE

OKLAHOMA

**Grade A**
Altitude Petroleum Co., Tulsa, Okla.

## BURNING OILS

OKLAHOMA

**42-44 Water White Kerosene**
Altitude Petroleum Co., Tulsa, Okla.

PENNSYLVANIA

**45 Water White Kerosene**
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.
**46 Water White Kerosene**
Emery Mfg. Co., Bradford, Pa.

## NEUTRAL OILS

PENNSYLVANIA

**150 Vis. No. 3 Asso. Filt.**
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.
**180 Vis. No. 3 Asso. Filt.**
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.
**200 Vis. No. 3 Asso. Filt.**
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.
**34 Gravity 350-360 Flash**
Pennsylvania Oil Products Refg. Co., Warren, Pa.

## CYLINDER OILS

PENNSYLVANIA

**600 Steam Refined**
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.
**635 Steam Refined**
Emery Mfg. Co., Bradford, Pa.
**650 Steam Refined**
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.
**600 Flash Steam Refined**
Emery Mfg. Co., Bradford, Pa.
**600 Warren E**
Pennsylvania Oil Products Refg. Co., Warren, Pa.
**600 Oil City E**
Pennsylvania Oil Products Refg. Co., Warren, Pa.
**Cold Test Stock (bright filtered)**
Pennsylvania Oil Products Refg. Co., Warren, Pa.
**Cold Test Stock (dark filtered)**
Pennsylvania Oil Products Refg. Co., Warren, Pa.
**Black Oil**
Emery Mfg. Co., Bradford, Pa.

## MOTOR OILS

PENNSYLVANIA—100% PURE
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.

## WAX

PENNSYLVANIA

**122-124 White Crude Scale**
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.

## FUEL OILS

OKLAHOMA

**24-26 Zero Fuel Oil**
Altitude Petroleum Co., Tulsa, Okla.
**32-36 Zero Gas Oil**
Altitude Petroleum Co., Tulsa, Okla.

PENNSYLVANIA

**36-40 Fuel Oil**
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.

# ROSTER OF OIL ASSOCIATIONS

American Association of Petroleum Geologists. Secretary, C. E. Decker, care University of Oklahoma, Norman, Okla.

American Chemical Society, Petroleum Division, Pittsburgh, Pa. Secretary, George A. Burrell.

American Institute of Mining and Metallurgical Engineers, Petroleum Division. 29 West 39th St., New York. Chairman, F. Julius Fohs.

American Oil Men's Association, 624 South Michigan Ave., Chicago, Ill. H. G. James, Secretary and Manager.

American Petroleum Institute, 15 West 44th St., New York City. Secretary, R. L. Welch.

Arkansas-Tennessee Oil Marketers Association. Secretary, R. E. McKellar, care Diamond Oil Co., Memphis, Tenn.

Association of Oil Jobbers of Mississippi, Jackson, Miss. President, R. C. Clark, Independent Oil Co., Tupelo, Miss.

Association of Natural Gas Supply Men, 905 Oliver Bldg., Pittsburgh, Pa. Secretary, William B. Way.

Association of Natural Gasoline Manufacturers, 504 A-B Cosden Bldg., Tulsa, Okla. Secretary, A. V. Bourque.

Association of Producers of Petroleum in Mexico, 17 Battery Place, New York, Director, Guy Stevens.

Cincinnati Oil Club. Secretary, E. V. Weber, care Eureka Oil Co., Cincinnati. Ohio.

Detroit Petroleum Club. Secretary, Frank McSweeney, Cities Service Oil Co., General Motors Bldg., Detroit, Mich.

Eastern Kentucky Oil Producers Association, Ashland, Ky. Secretary, David Browning.

Gulf Coast Independent Oil Producers Association, 403 Goggan Bldg., Houston, Tex. Secretary, T. L. Smith, Jr.

Illinois Petroleum Marketers Association, Secretary, G. A. Primm, Sunbeam Oil Co., and Cloverleaf Oil Co., Springfield, Ill.,

Independent Oil Men's Association of Massachusetts. Secretary, F. E. Bergfors, care Quincy Oil Co., Quincy Adams, Mass.

Independent Oil Men's Association of New England. Secretary, I. H. Farrar, Berkshire Oil Co., Worcester, Mass.

Independent Oil Marketers Association of Atlanta, Ga. Secretary, J. H. Smitha, care Community Oil Co., Atlanta, Ga.

Independent Petroleum Marketers Association of California, Inc., 930 Marsh-Strong Bldg., Los Angeles, Calif. Secretary and Manager, H. H. Maxson.

Indiana Independent Petroleum Marketers Association. Field Secretary, Sam T. Hurd, Connersville, Ind.

Iowa Independent Oil Men's Association, 225 Fifth St., Des Moines, Ia. Secretary, M. L. Long.

Kansas Oil Men's Association, 423 First National Bank Bldg., Wichita, Kan. Secretary, J. A. Motter.

Kentucky Oil Men's Association, Ind., Trust Co. Bldg., Lexington, Ky. Secretary, Thomas S. Scott.

Michigan Independent Oil Men's Association, 220 Ashton Bldg., Grand Rapids, Mich. Secretary, P. R. Kempf. Field Secretary, James A. Gilmore.

Mid-Continent Oil & Gas Association, 505 Cosden Bldg., Tulsa, Okla. Secretary, Harry H. Smith.
Kansas-Oklahoma Division, 505 Cosden Bldg., Tulsa, Okla. Secretary, Harry H. Smith.
Louisiana-Arkansas Division, 724 Giddens-Lane Bldg., Shreveport, La. Secretary, Joseph B. Elam.
Texas Division, P. O. Drawer 1567, Dallas, Texas. Secretary, J. P. Laney.

Minnesota Petroleum Association, 638 Builders Exchange, Minneapolis, Minn. Secretary, Paul E. Hadlick.

Missouri Oil Men's Association, 627 New York Life Bldg., Kansas City, Mo. Secretary, George S. Allee.

Montana Oil & Gas Association, Helena, Mont. Secretary, C. C. Adams.

National Association of Independent Oil Producers, 414 Atlas Bldg., Tulsa, Okla. President, William H. Gray.

National Petroleum Association, Munsey Bldg., Washington, D. C. Washington Counsel, Fayette B. Dow.

National Petroleum Marketers Association, Blum Bldg., 624 South Michigan Ave., Chicago, Ill. President, L. V. Nicholas.

Natural Gas Association of America, 905 Oliver Bldg., Pittsburgh, Pa. Secretary, Guy F. Batchelor.

Natural Gas & Petroleum Association of Canada, Chatham, Ont., Canada. Secretary, S. A. Morse.

Nebraska Independent Oil Men's Association, 416 Terminal Bldg., Lincoln, Neb. Secretary, C. M. Sutherland.

New York State Oil Producers Association, Wellsville, N. Y. President, Lewis H. Thornton.

New York State Petroleum Marketers Association, 1201 So. Salina St., Syracuse, N. Y. Secretary to be elected.

North Dakota Petroleum Association. Secretary, D. M. Hitchcock, care International Oil Co., Minot, N. D.

Northwest Independent Oil Association. Secretary, C. H. Brown, care Arro Oil & Refining Co., Lewistown, Mont.

Northwestern Pennsylvania Oil Producers Association, 78 Main St., Bradford, Pa. President, A. Edward Booth.

Ohio Gas & Oil Men's Association, 811 First National Bank Bldg., Columbus, O. Secretary, William H. Thompson.

Ohio Petroleum Marketers Association, 616 Commerce Bldg., Columbus, O. Secretary, C. A. Laubach. Field Secretary, W. C. Hughes.

Oil Men's Association. Secretary, F. W. Mitchell, Clinton Oil Co., Cleveland, O.

Oil Trade Association of Philadelphia, Inc. Secretary, Howard M. Rogers, 20 South 15th St., Philadelphia, Pa.

Oil Trades Association of New York, Inc., 35 So. William St., New York City. Secretary, Joseph C. Smith.

Oklahoma Oil Jobbers Association, 416 Fidelity National Bank Bldg., Oklahoma City, Okla. Secretary, C. M. Kinney.

Oklahoma Oil Marketers, Inc., P. O. Box 755, Enid, Okla. Secretary, W. W. Blackburne.

Okmulgee District Oil & Gas Association, Okmulgee, Okla. Secretary, Charles I. O'Neill.

Osage Oil & Gas Lessees Association, 505 Cosden Bldg., Tulsa, Okla. Secretary, Harry H. Smith.

Pennsylvania Grade Crude Oil Association, 209 Chambers Bldg., Oil City, Pa. Secretary, R. J. Alexander.

Petroleum Club of Central New York. Secretary, George R. Casey, Crown Oil Co., Syracuse, N. Y.

Rocky Mountain Independent Oil Men's Association, (formerly Colorado Petroleum Club), 412 Commonwealth Bldg., Denver, Colo. Secretary, A. Overholtzer.

Rocky Mountain Oil & Gas Association, P. O. Box 1559, Casper, Wyo. Secretary C. W. Sparr.

South Dakota Independent Oil Jobbers Association, Sioux Falls, S. D. Secretary, F. H. Buehler, care Dacotah Oil Co., Madison, S. D.

Southern Petroleum Jobbers Association. Secretary, D. C. Patterson, Camden, S. C.

St. Louis Petroleum Club, 1430 So. Vandeventer Ave., St. Louis, Mo. Secretary, R. F. Leinberger, Blackmer Pump Co., St. Louis, Mo.

Springfield Petroleum Club. Secretary Ross Lock, c/o Lock Bros., Oil Co., Springfield, Ill.

State Executives Club. Secretary, Paul E. Hadlick, Minnesota Petroleum Association, 638 Builders Exchange, Minneapolis, Minn.

Technical Club of Oklahoma, 208 Fisher Bldg., Tulsa, Okla. Secretary, R. I. Ginter.

Tennessee Independent Oil Men's Association, Secretary, Tom S. Cooper, c/o Estes-Cooper Oil Co., First St. & L. & N. R. R., Nashville, Tenn.

Texas Independent Oil Men's Association, Secretary, L. A. Greene, care Radio Petroleum Co., Fort Worth, Tex.

West Virginia Oil Association, Fairmont, W. Va. Secretary, Edwin Robinson.

West Virginia Oil Marketers Association. Secretary, D. E. Frierson, Frierson Equipment Co., Charleston, W. Va.

Western Petroleum Refiners Association, 504 Cosden Bldg., Tulsa, Okla. Managing Director, Howard Bennette.

Wisconsin Independent Oil Jobbers Association. Field Secretary, R. A. Overholser, Gay Bldg., Madison, Wis.

Wyoming Petroleum Club. Secretary, G. H. O'Donnell, 847 So. Lincoln St., Casper, Wyo.

## New Oil Station Construction

**Beaver Falls, Pa.**—Premier Oil & Gasoline Co. building bulk and service station here, to be equipped with four 12,000 gallon storage tanks for gasoline, handling Pennzoil products.

* * *

**Wathena, Kan.**—Consumers Oil Co. is building service station here, handling Shell Co.'s products. Another truck was put into service on March 1, making three in all, reports L. Parker, manager.

* * *

**St. Louis, Mo.**—Poland Oil Co., who recently completed bulk station at Mt. Olive, Ill., is planning construction of another at McLeansboro, Ill.

* * *

**Spokane, Wash.**—Union Oil Co. of California, Los Angeles, will build 10 wholesale distributing plants in Spokane district early in the spring.

* * *

**Spokane, Wash.**—H. Earl Clack Co. planning to build several bulk stations in Washington and Idaho, according to Gardner Davis, manager.

* * *

**Piedmont, Mo.**—The Home Oil Co. to build filling station at Greenville, Mo. immediately, according to R. E. Marsh, manager.

* * *

**Phoenix, Ariz.**—Rio Grande Oil Co. building bulk station at Mesa, Ariz., also two service stations at Bisbee, Ariz.

* * *

**Altoona, Pa.**—Independent Oil Co., with main offices here, is building service station at Pleasant Gap, Pa.

* * *

**Beaver Falls, Pa.**—Shuster-Duncan Motor Sales building service station here, handling Sinclair products.

* * *

**Loraine, Ill.**—S. O. Lancaster, formerly proprietor of Lancaster Oil Co., is seeking site for bulk station.

* * *

**Hamlin, Tex.**—L. H. Hopper erecting filling station, to handle Gulf Refining Co. products.

* * *

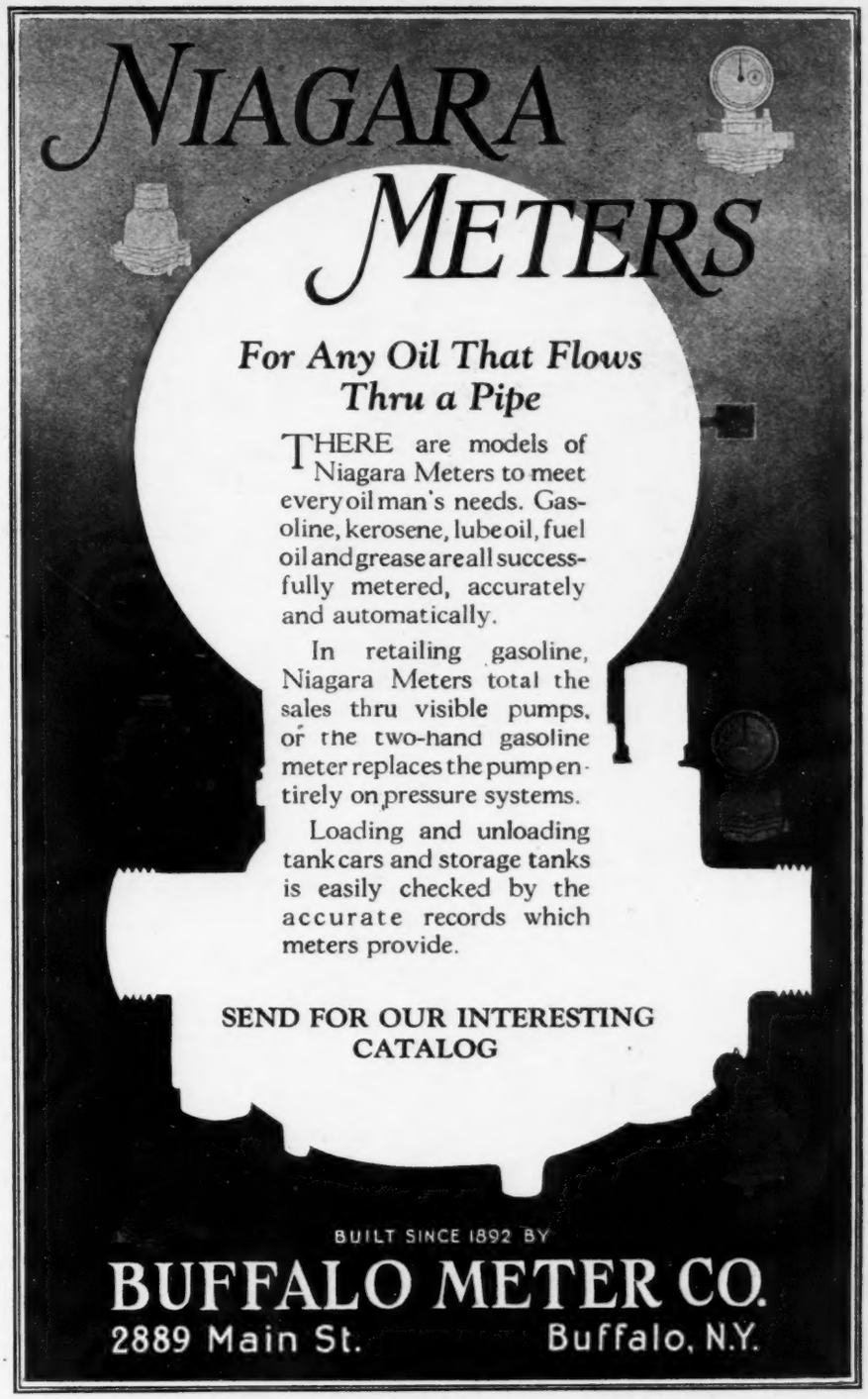
**Helena, Ga.**—H. C. Saunders, owner of Helena Oil Co., is building station at McRae, Ga.

* * *

**Mexico, Mo.**—Errol Oil Co. will build service station here this spring.

---

CHATTANOOGA, TENN.—Southeastern Oil Co. has rebuilt its bulk station which was destroyed by fire last fall. The new warehouse is fireproof. It is made of brick with concrete floors and loading platform, reports M. H. Senter, president.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**National Petroleum News**

**817 Caxton Building, Cleveland, Ohio**

# To men who ride this hobby

## *Buying the best— as a matter of policy*

For the jobber who isn't satisfied with selling anything less than the best; who believes that the satisfaction of his customers is of paramount importance to his business success; who expects the same courtesy, promptness aud square-dealing from his refiner as he, himself, assures the public; and, to repeat, *who isn't satisfied with anything less,* we make Globe Gasoline.

Our constantly increasing business, due to public patronage of Globe jobbers, is absolute proof that Globe Gasoline answers, completely, every requisite for *good* gasoline. Write, wire or 'phone for quotations.

GLOBE OIL & REFINING COMPANY

Refinery: Blackwell, Okla. Sales Office: 708 Atlas Bldg., Tulsa

# GLOBE

## PETROLEUM PRODUCTS

# HERE & THERE

National Petroleum News

**A. J. Smith, general superintendent,** and H. D. Van Deman, refinery engineer, both of the Paragon Refining Co., Toledo, O., have returned from the east where they attended the refinery symposium of the A. I. M. E. in New York, and visited some of the larger refineries.

Mr. Smith believes that the co-operation shown by the refiners generally by having their representatives attend scientific meetings and exchange ideas on vital technical and economic problems now confronting the industry, will be of great benefit to the industry.

* * *

**W. M. Lanzer, who has been traveling** representative in Wisconsin for W. H. Barber Co., Chicago, has been promoted to the general offices of the company, and is succeeded in Wisconsin by Thomas W. Bloom, who was transferred from Iowa territory. A. R. Few has been assigned to Iowa territory.

* * *

**Benjamin J. McNelly, for many** years chief chemist with the Arizona highway department, has been appointed agent at Miami, Ariz., for The Texas Co., Houston, Tex., succeeding Mr. Van Hook, who resigned to enter another line of business, according to C. E. Golding, agent for The Texas Co. at Mesa.

* * *

**E. F. Schlee, president of Wayco** Oil Corp., Detroit, Mich., has just returned from a trip to Cuba, Panama and Central America.

A. G. Schlee, president of the Wayco Land Co., Detroit, leaves in March on a trip to London, Paris, Berlin, and other European points.

* * *

**A. E. Bradley, who has been traveling** representative for the past four years for The Texas Co., Houston, covering southern Illinois territory, has been appointed agent in that territory with headquarters at West Frankfort, Ill.

* * *

**P. T. Benton, district manager at** Miami Fla., for the Seaboard Oil Co., Jacksonville, Fla., spent a week in Havana, Cuba, recently and "slipped around steins of good tropical beer," according to reports.

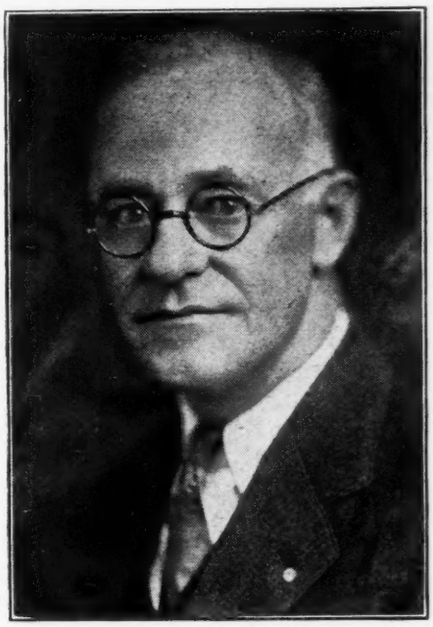
* * *

**C. S. Mitchell, manager of Fuel Service** Co., Malden, Mo., has bought a service station from C. C. Vineyard and expects to add another truck by March 1 to handle country trade.

* * *

**F. A. Johnston, formerly part owner** of the Capitol Oil Co., Springfield, Ill., has been appointed operating agent at Springfield for The Texas Co., Houston, Tex.

**Myron P. Williams, president of the** Associated Producers Co., New York, and James O. Lewis, petroleum engineer, Tulsa, Okla., are spending a few days in the Bradford, Pa. field inspecting compressed air projects now in operation on the Associated properties, according to O. F. Thompson, general superintendent of the Associated company.



**William Kleissle, vice president of J. D. Streett & Co., Inc., St. Louis, Mo., who was recently elected vice president of the St. Louis Petroleum Club. Mr. Kleissle was formerly treasurer of the club.**

* * *

**R. T. Zook, president of the Sloan** & Zook Co., Bradford, Pa., producers, manufacturers and marketers, together with L. J. Kerlin, of the Corliss Carbon Co., Bradford, have left for a stay of several weeks at Havana, Cuba, reports William J. Sloan, treasurer.

* * *

**J. H. Robinson, agent at Mexico,** Mo. for the Standard Oil Co. of Indiana, has just returned from Moberly, Mo. where he attended a meeting of Standard Oil men.

* * *

**C. P. Poland, general manager of** the Poland Oil Co., St. Louis, Mo., and Mrs. Poland, have just returned from a two weeks' stay at New Orleans, according to E. D. Poland, secretary.

* * *

**B. F. Golding, agent at Yuma, Ariz.** for the Standard Oil Co. of California, for the past five years, has been transferred to Kingman, Ariz. to fill a similar position.

**R. B. Werey, who recently resigned** as assistant refinery engineer at the Bartlesville, Okla. station of the U. S. Bureau of Mines, is sailing from New York on Feb. 27 on the "Pan American" for La Plata, near Buenos Aires, where he will be assistant superintendent of the Argentine Government refinery. The plant was recently completed by the Bethlehem Steel Co., New York.

* * *

**F. E. Reinhardt, president of the** Peerless Oil & Refining Co., Chanute, Kans., and J. E. Wyatt, manager of the Kansas City office, have just returned from a two weeks' trip through Minnesota and Wisconsin, calling on the jobbing trade. They report that prospects for oil jobbers in that territory are good and that gallonage was holding up well.

* * *

**C. F. Anforth, credit manager for the** Rio Grande Oil Co., Los Angeles, Calif., and Mrs. Anforth are in Arizona looking over that company's new plant and the stations being built at Tombstone, Bisbee and Douglas, Ariz., reports H. A. Hayes, agent at Bisbee for the company.

* * *

**S. O. Lancaster, proprietor of the** Lancaster Oil Co., Loraine, Ill., has sold his bulk station to a company which will operate the station under the name of the Loraine Oil Co. Mr. Lancaster is now seeking another location.

* * *

**O. F. Ferrin, has been appointed** agent for the Panhandle Oil Co., at Mesa, Ariz. This company is the latest oil marketer to enter the southern Arizona field, and is maintaining its headquarters in that state at Tucson.

* * *

**Joseph N. Pigot, president of The** Pigot, Sayre Co., New York City, sailed on Feb. 17 on the steamer George Washington for Miami, Fla. Mr. Pigot is vice president of the Oil Trade Association of New York, Inc.

* * *

**E. W. Golden, formerly zone representative** of the Arizona division for The Texas Co., has been transferred to the agency at Tucson. H. O. Norville succeeds Mr. Golden.

* * *

**M. D. Fralick, Cheboygan, Mich., is** on a trip through the eastern and central part of the United States. He will also visit Cuba and is spending the winter in Florida.

* * *

**Merlin A. Taylor, formerly with the** White Eagle Oil & Refining Co., Kansas City, Mo., is now representing Kent Oil Co., which operates in western Kansas.

A dependable product coupled with consistent cooperation with the jobber is the policy which has kept
KANOTEX
Petroleum Products
to the front in the estimation of the trade. Kanotex Gasoline is a particularly high grade product and wherever known is recognized for its quality. It is clean, power-giving and well adapted to cold weather use.
THE KANOTEX REFINING CO.
A. F. MORRISON, Sales Manager
Phone L. D. 4, Arkansas City, Kansas
KANOTEX

## Used Oil Equipment

If you want to buy it—turn to the classified advertising page at the back of this issue. If what you want is not listed there, why not insert an advertisement of your own next week?

If you want to sell it—follow the same course.

There is a constant market in used oil equipment. Take advantage of the great savings possible, either by selling what you no longer need or buying what you do need.

**National Petroleum News**

892 Caxton Building — Cleveland, Ohio


# Oil Patents Issued Recently

## Production

**Fishing Tool.**—Monrowe Walter Jones, Ardmore, Okla. Filed Nov. 20, 1922. No. 1,570,065.

**Pipe-Gripping Device.**—Peter Gustaf Leonard, West Tulsa. Filed Feb. 16, 1925. No. 1,570,069.

**Indicator and Safety Coupling for Rotary Drills.**—Gary Allen Goldsmith, Long Beach, Cal. Filed Feb. 4, 1924. No. 1,570,244.

**Pump Jack.**—Edward R. Purvis, Shreveport, La. Filed Sept. 22, 1925. No. 1,570,280.

**Cleaning Lubrication of Deep-Well Pumps.**—Victor Schleyer, Anderson, Ind., assignor, by mesne assignments, to Dean Hill Pump Co., Anderson, Ind. No. 1,570,285.

**Device for Removing Pump Liners and Valve Seats.**—Bernard H. Davis, Fullerton, Cal. Filed Apr. 12, 1923. No. 1,570,338.

**Pumping Power for Oil Wells.**—Robert A. Dresser, Bradford, Pa. Filed Aug. 21, 1925. No. 1,570,343.

**Pump Mechanism.**—John M. Lea, Detroit. Filed Jan. 27, 1923. No. 1,570,381.

**Method and Apparatus for Drilling Holes.**—Joseph Stuart Mitchell, Chicago, assignor to Sullivan Machinery Co. Filed Mar. 26, 1919. No. 1,570,518.

**Boring Tool.**—Emil Gairing, Detroit. Filed Dec. 6, 1923. No. 1,571,260.

**Well-Drilling Apparatus.**—Orlando B. Wall, Wichita, Kans. Filed Mar. 28, 1922. No. 1,571,309.

**Fishing Tool.**—Louis W. Herming Hausen, Mendon, Mo., assignor of one-half of James H. Staples, Shawnee Okla. Filed Feb. 21, 1925. No. 1,571,332.

**Drill Bit.**—Clarence O. Stee, Butte, Mont. Filed Dec. 13, 1923. No. 1,571,348.

**Extension Bit.**—Geo. W. Staley, San Francisco. Filed May 3, 1923. No. 1,571,497.

**Attachment for Sand Caps or Oil Savers.**—Guy A. Sequine, Fredonia, Kans., assignor on one-sixteenth to Frederick A. Ost, Fredonia, Kans. Filed Feb. 7, 1924. No. 1,571,740.

**Drive-Well Point.**—Charles F. D. Smith, Lake Wales, Fla. Filed May 10, 1924. No. 1,571,871.

**Swab.**—Frank W. Leidecker, Tulsa. Filed July 2, 1924. No. 1,571,876.

## Refining

**Process of Treating Oil.**—Gustav Egloff and Harry P. Benner, Independence, Kans., assignors to Universal Oil Products Co., Chicago. Filed Aug. 20, 1920. No. 1,569,855.

**Process for Refining Oils.**—Jacque C. Morrell, Chicago, assignor to Universal Oil Products Co., Chicago. Filed Aug. 28, 1922. No. 1,569,870.

**Process for Refining Hydrocarbon Oil.**—Jacque C. Morrell, Chicago, assignor to The Universal Oil Products Co., Chicago. Filed Aug. 31, 1922. No. 1,569,871.

**Process for Refining Cracked Hydrocarbon Oil.**—Jacque C. Morrell, Chicago, assignor to The Universal Oil Products Co., Chicago. Filed Aug. 31, 1922. No. 1,569,872.

**Medium for Bleaching, Cracking, and Desulphurizing Petroleum and other Hydrocarbon Compounds and Process of Preparing Same.**—Herman Reinbold and Hugo Reinbold, Omaha, Nebr. Hugo Reinbold assignor to Herman Reinbold. Filed Jan. 21, 1924. No. 1,570,005.

**Treating Petroleum Oils.**—Roland B. Day, Lansdowne, Pa. Filed Aug. 5, 1921. No. 1,570,131.

**Operating Member.**—Maurice R. Horrell, Chanute, Kans., assignor of two-thirds to The Western Drilling Tool & Supply Co., Chanute, Kans. Filed Sept. 14, 1925. No. 1,570,153.

**Motor Fuel.**—Ralph H. McKee, New York. Filed Nov. 19, 1923. No. 1,570,161.

**Separation of the Constituents of Gaseous Mixtures.**—Claude C. Van Nuys, Crandord and Walter Wilkinson, Jersey City, N. J., assignors to Air Reduction Co., N. Y. Filed June 24, 1924. No. 1,571,461.

**Fractionating Tower.**—Frank Bernette Samuel, Baton Rouge, La. Filed Apr. 17, 1924. No. 1,571,805.

## Miscellaneous

**Process for the Extraction of Helium from Gases Containing the Same.**—Robert Roger Bottoms, Lakewood, N. J. Filed Dec. 27, 1924. No. 1,569,943.

**Grease-Dispensing Device.**—Jacob Baldner, Xenia, Ohio. Filed Mar. 21, 1921. No. 1,570,031.

## Industrial Notes

**The Barber Asphalt Co., Philadelphia,** has taken over the exclusive rights to manufacture "Aterite," a non-corrosive, acid-resisting metallic alloy from the Aterite Co., Inc., New York City.

* * *

**Moore & Kling, Inc., Boston, Mass.,** manufacturer of oil equipment, has increased its factory space, having taken new space in the same building. The lower floor is devoted to storage while offices are on the floor above.

The company will have ready for distribution around March 1 a new catalog devoted to its line of service and bulk station equipment. It will exhibit, as usual, at the annual convention of the New England Oil Men's Association at Boston to be held March 10 and 11.

* * *

**Autocar Co., Ardmore, Pa.,** one of the pioneers in the manufacture of commercial automobile trucks, is planning to re-organize to include an issue of non-voting stock with provisions in the by-laws regarding the issue which will meet with the requirements of the New York Stock Exchange. The reorganization is being planned by a group of New York and Philadelphia bankers.

* * *

**Lipman Pump Works, Rockford, Ill.,** has just placed on the market a new portable penetrating oil unit for lubricating car springs through air pressure. The new unit consists of a 12-gallon steel tank mounted on a wheeled metal base and it can be wheeled about the plant. An automatic air pressure agitator keeps graphite constantly mixed with the oil.

## Industrial Catalogues

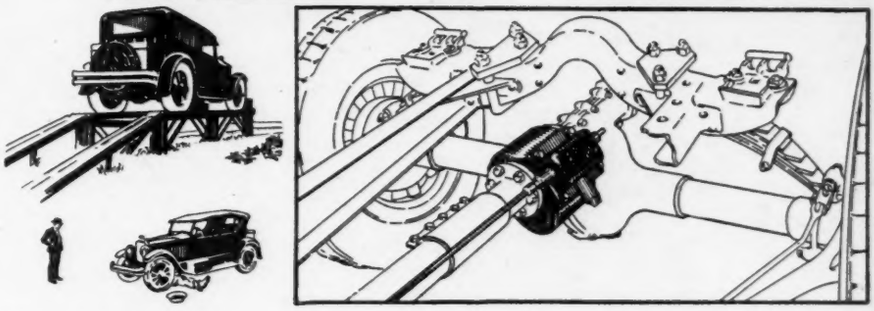
**The Goodyear Tire & Rubber Co., Inc., Akron, O.**—A booklet on breather bags to eliminate or reduce evaporation losses of crude, and gasoline in storage, has been published, and mailed to oil refiners and marketers. A pamphlet on all steel structures to house the breather bags has been mailed simultaneously by the Truscon Steel Co., Youngstown, O.

The booklet describes the construction, uses, cost of the bags, and includes charts which show the savings in evaporation effected. Illustrations of installations at the Whiting, Ind. refinery of the Standard Oil Co. of Indiana are shown. Two units have recently been installed at the Baytown, Tex. plant of the Humble Oil & Refining Co.

* * *

**Broderick & Bascom Rope Co., St. Louis, Mo.**—A booklet entitled "Driller: Know Your Ropes" points out to the driller the many abuses to which a wire rope is subjected and endeavors to show him that if he will use more care in handling his wire ropes, he will experience less trouble.


# LIKE THE DRAIN RACK
# THE FULLER
*AUXILIARY TRANSMISSION*
FOR FORD TRUCKS
# HELPS YOU SPEED UP SERVICE



The drain rack has been a big factor in boosting oil profits. Compare the speed of servicing a car now with the old slow way of lying down and squirming under. The drain rack earns you money, because it speeds up service.

The FULLER Auxiliary Transmission also earns you money. It speeds up your trucking, because it adds to the planetary transmissions of your Ford Trucks the big advantages of sliding gear control.

The FULLER gives your trucks a speed for every road condition. Equipped with this unit they'll have the regular Ford high speed for level stretches—an intermediate speed for ordinary hills—the regular Ford low speed for steep hills, and in addition, a double low for the very bad places.

The FULLER adds 80% more pulling ability to the Ford Truck. With these units your trucks will make good time carrying heavy loads over bad roads. Your trucks will last longer, too, because the FULLER is scientifically designed to put the pulling stress on parts that are amply strong to carry it.

It will pay you to investigate the profit-making possibilities of the FULLER. Ask your Ford Dealer.

## PRICE $67.50 INSTALLED

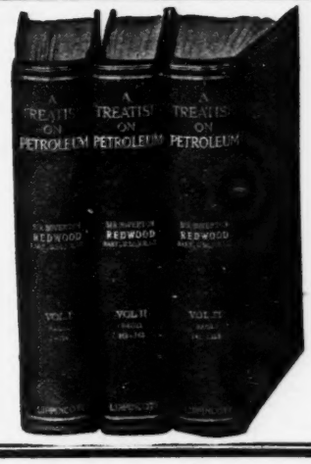
**Plus 2½% War Tax. $5.00 Additional West of the Rockies.**

## FULLER & SONS MFG., CO.

**KALAMAZOO MICHIGAN**

TRANSMISSION BUILDERS FOR 22 YEARS






**Information on all branches of the petroleum industry is to be found in the 4th edition of A TREATISE ON PETROLEUM by Sir Boverton Redwood.**

**To obtain this valuable set make your check for $39 payable to**

**NATIONAL PETROLEUM NEWS**
**811 Caxton Bldg. Cleveland, Ohio**

# Oil Man's Bookshelf

A successful department head remarked the other day:

> "I find it necessary to keep up a constant program for *self improvement* in order to prevent my becoming obsolete so far as my value to my company is concerned."

And to the study of the best books on his work, he attributed a good share of his advancement.

The OIL MAN'S BOOKSHELF will help you select books on oil that you can read with the greatest profit. If you do not find the subject you are interested in below, write us.

## ACCOUNTING for the PETROLEUM INDUSTRY

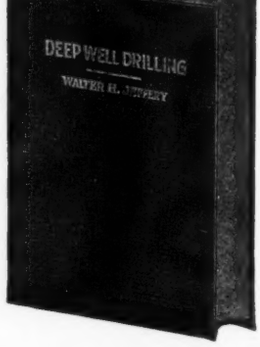
"Accounting for the Petroleum Industry" by D. F. Morland and R. W. McKee, is one of the most practical and comprehensive works on accounting principles and procedure for all branches of the oil industry — production, transportation and storage, refining, marketing.

Accounting for each branch is discussed separately; description of technical practices is given, and the accounting problem to be solved in each activity is set forth together with sample forms in use; tables for depreciation rates, etc.

For refinery accounting this book recommends the "weighted selling ratio method" which is described in detail and which has the advantage of determining for every product a cost which will allow for a reasonable profit when disposition is made thereof.

"Accounting for the Petroleum Industry" is carefully prepared and the most practical book written on the subject of accounting for the oil business.

304 pages—Price $4.00




The second edition of "Deep Well Drilling" by Walter H. Jeffery is just out. The material in the first edition has been rewritten thruout with several new chapters on improvements in the art of drilling.

"Deep Well Drilling" discusses exhaustively cable tool drilling, rotary drilling, core drilling in all their phases; tells how to fish for lost tools; how to case, how to use packers, how to cement and how to shoot; how to plan operations intelligently; specify material, etc.

Every man engaged in the production of oil should have a copy. 648 pages, illustrated, price $6.00.

## RECOVERY of GASOLINE from NATURAL GAS

A glance over a few of the chapter headings indicates how thoroughly the author, George A. Burrell, goes into the subject of "Recovery of Gasoline from Natural Gas" in his new book:

Occurrence of gasoline in natural gas—Applying "vacuum" to wells —Gas leases—Chemistry and analysis of natural gas—Testing for gasoline content—Measuring—Gas carrying capacity of pipe lines—Compression method—Absorption process—Charcoal process — Extraction from Residue gas—Blending—Fractionating columns — Depletion—Removal of Hydrogen-Sulfide—Sulfur—Relation between vapor tension and distillation loss — Shipping losses — Gasoline loading apparatus — Insulating gasoline storage tanks—Accidents in transporting—Hazards in gasoline plants—Gas engines and compressors—Horse power required to compress — Steam boilers — Steam engine — Pumps used in gasoline recovery—Water cooling systems — Pipe for natural gas plants—Tanks—Regulators, relief valves, traps, thermostats, meters —Construction and operating costs of plants—Fuel economy—Depletion of properties—Other motor fuels than gasoline—Testing gasoline—etc.

590 pages, 210 illustrations, price $7

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*Cut out and mail*

National Petroleum News,
838 Caxton Bldg., Cleveland, Ohio.

I want the books checked below. Enclosed is check or money order for $_____

☐ *Accounting for the Petroleum Industry* by R. W. McKee $4.

☐ *Deep Well Drilling* by W. H. Jeffery $6.00.

☐ *Recovery of Gasoline from Natural Gas* by G. A. Burrell $7.

NAME _____

Address _____

_____

_____

# ON THE LAZY BENCH

National Petroleum News

## Pete's Marketgram

(As issued by the Refiners Consolidated Sales Co., Wichita, Kans.)

Hello, folks, pedestrains and human husks. This is station R. C. S. C. broadcasting, with me, Pete, at the microphone.

The 'folks' mean you of the oil tribe; the 'pedestrains' refer to those of us who used to walk, but now leap; and the 'human husks' are simply those of us who are not what we used to was.

By the way, I've read some newspaper comment on killing off the present crop of human husks and, if the correct meaning of that term has filtered through my ivory, will venture the prediction that it is going to afford a right smart lot of employment to clean up the second largest industry alone, where they get old quicker by merely thinking than in any other business.

But then, we need not sweat and stew about it, for the newspaperes get away with a lot of foolishness from day to day. Ferinstance, during the last week they quote a local minister who denied that the churches had ever caused wars, when it is doubtful if the old boy could remember the number of marriages he has performed.

Then in big headlines they announce that Iowa does not know what to do with their large corn surplus, when every inhabitant of Oklahoma over 15 years of age can tell them that the first thing to do is to make mash.

Next is a big story of the remarkable discovery that wild life is fast disappearing from the country, though we all know it is just moving into city apartment houses.

The Committee of Eleven, which sounds like an African domino team but isn't, went to Washington last week, to knock the prop out of propaganda by telling whats what and whos who to some of the big guns there that a less considerate cuss than myself might refer to as a group of smooth bores.

There seems to be a lot of people sojourning at the world's leading ivory market who will not die happy till they further clutter up business in general and the oil business in particular with a lot of new laws, rules and regulations.

What we need is less laws, or at least an amendment to the constitution to require the repeal of at least one fool law before passing another. Yes sir, big business needs its freedom a darn sight more than do the Filipinos. Particularly the oil business, against which they have been passing laws ever since John D. wore a bib, and they are still at it.

Now folks, I don't mean to convey the idea that the oil business is skidding sidewise down the oily road to damnation, but I do contend there is a lot of Spanish music in it that is not exactly guitar playing, and as a whole, its just as uncertain as the squirt of a grape fruit.

❦ ❦ ❦

"A deep orange monkey fur is now popular," says a fashion paper. A friend of ours remarks that if he ever saw a deep orange monkey he would stick to soft drinks. —Boston Transcript

Wonder what would happen if he saw an orang-utan.

❦ ❦ ❦

One Friend (to another)—"What were you doing at the information desk?"

"I wanted to find out something."

"But you can't find out anything at an information desk."

"That's what I found out."

## Force of Habit

"Deacon White," asked Parson Jackson, "will you lead us in prayer?"

There was no answer.

"Deacon White," this time a little louder, "will you lead?"

Still no answer. Evidently the deacon was sleeping. So the parson raised his voice to a higher pitch in a third appeal which succeeded in rousing the drowsy man. "Deacon, will you lead?"

The deacon in bewilderment rubbed his heavy eyes and said:

"Lead yourself, I just dealt."

—The Booster

❦ ❦ ❦

Patron (phoning message) "Make the signature W. N. Dill."

Operator: "Is the first letter B, as in Bill?"

Patron: "No, Dill as in pickle."

—The Booster

❦ ❦ ❦

*My dentist was a fine fellow. Each time he extracted a tooth he gave me a glass of whiskey."*

*"Don't you go to him any more?"*

*"I haven't any more teeth left."*

❦ ❦ ❦

## An Unblemished Record

Weary Bill declared he wanted to earn a bite to eat.

"Well," said the farmer's wife, "If I thought you were honest I'd let you go to the chicken house and collect the eggs."

"Lady," he replied with dignity, "I was manager at the Public Baths for fifteen years and never took a bath!"

—Iowa Independent Topics

❦ ❦ ❦

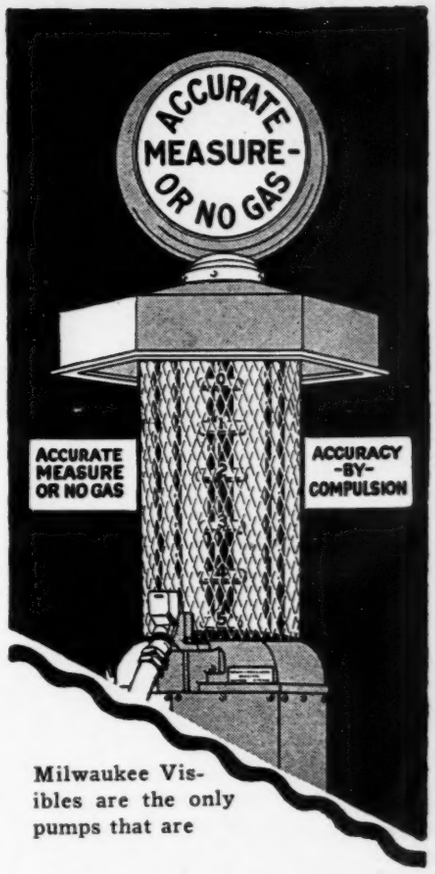
## Query

Dear Mr. Colgate:

I bought a tube of your shaving cream. It says no mug required. What shall I shave?

Yours very truly,

A Beginner.


Milwaukee Visibles are the only pumps that are

**"Compulsory-Accurate"**

both in construction and operation.

Until the easy-acting Flow Lock is set to positive exact measure the pump is locked and will not serve gas.

*Write for plan that guarantees increased gallonage.*

*That is the meaning of—*

# FRY

## This Is Jimmy

All America is becoming acquainted with Jimmy—the Courtesy Man.

Wherever you find Fry Visible Pumps you find Jimmy giving service of a more courteous nature.

Much of this is due to the influence of the great Fry courtesy campaign now running in the Saturday Evening Post.

Courtesy develops greater gallonage.

Fry pump operators reap the benefits.

Guarantee Liquid Measure Co.
Rochester, Pa.

# JIMMY
## the Courtesy Man

Made in five and ten gallon capacities —both labeled by the Underwriter's Laboratories.

# Refinery - Tank Wagon Markets

National Petroleum News

## Fuels and Kerosenes Keep Market In Mid-Continent Alive

Staff Special

TULSA, March 1

ABOUT the most pleasant thing one can say about the Mid-Continent refinery markets in February is that the month was a short one.

Refiners let the final week drag by, devoting most of their time to keeping prices fairly well in line despite the prolonged lack of demand. They already had become reconciled to a month of "losses" and many no doubt breathed a sigh of relief as today's business was finished and preparations made to attend the convention of the Western Petroleum Refiners' Association at Fort Worth next week.

Gasolines failed to show any signs of life during the week. Kerosenes held steady. Gas oil become stronger as prospective buyers became more firmly convinced that the oil was in the hands of a relatively few companies. While low gravity fuels were soft because of the quantity in the field, the higher gravity fuels became unusually scarce and closed the week at higher prices.

### Quit Blending High Gravities

This situation especially in Oklahoma can be attributed to the fact that many refiners have quit making higher gravity fuels regularly since gas oil is in demand. When a higher gravity is desired, they blend up the lower grades with gas oil, and seldom can a refiner who has both products see a profit in making the blend when he can easily dispose of his gas oil at a better price per gallon than he could get for the higher gravity fuel, and still find a fairly good market for the heavy fuel he would use in blending.

In Texas a part of the price increase can be traced to the monthly purchases by railroads and industrial companies. The market for fuel oils stiffens regularly around the end of the month, due to the fact that many of these purchases are made in the open market and spirited bidding some times occurs.

The Louisiana and Arkansas fuel markets have been given a firm foundation for almost the entire year as a result of the purchase a few days ago of a large quantity of fuel by the International & Great Northern and Southern Pacific railroads. The Southern Pacific bought largely in Louisiana, while the I. & G. N., which is a part of the Missouri Pacific system, bought heavily in Arkansas. Around 2,000,000 barrels were bought in the two fields, it was reported, some of the contracts running for six months and others for a year. Prices ranged from $1.05 to $1.15, refiners report.

Higher gravity fuel oil is in fair demand in Kansas for diesel engines, and refiners who have the material found no difficulty in getting their prices up somewhat last week.

Texas kerosenes set the pace for that commodity, while the prices of kerosenes in other areas marked time, but never with evidence of taking a backward step. Some kerosene was being sold in Texas the latter part of the week at 7 cents, while the sales in Oklahoma at that figure were becoming more in order. There was some kerosene in Texas, however, which the refiner admitted was off color, selling as low as 6½ cents.

### Only Few Benefitted

Only a few number of refiners, however, could take advantage of the better motor fuel prices this week. The majority continued to feel the pinch of high crude and low gasoline prices. And added to that was the still bigger loss, in many instances, of having cars rejected or cancelled by jobbers.

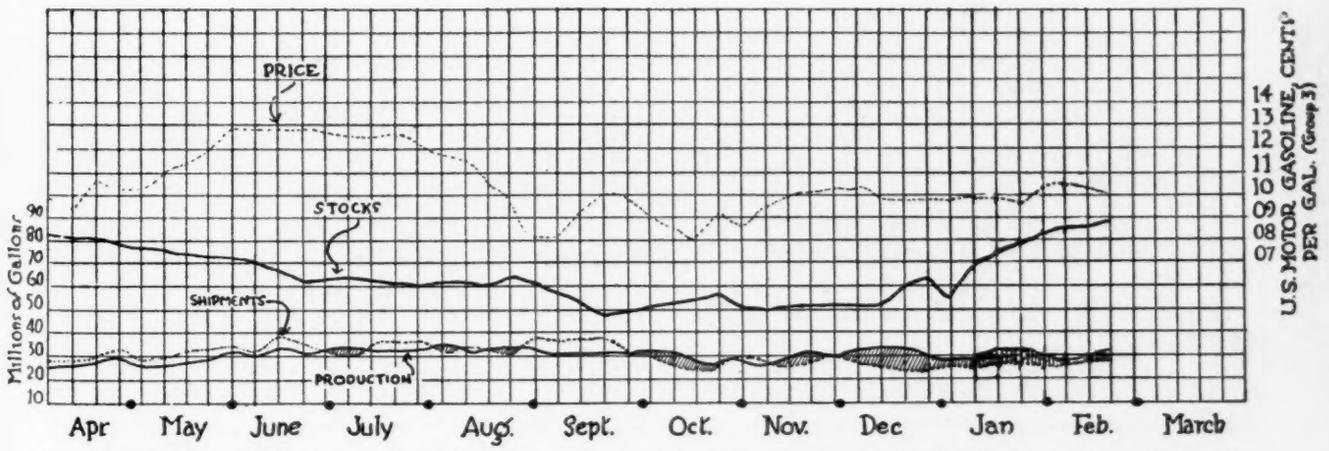
This situation, always met with to some extent when prices sag during the month, was worse than usual this time, refiners report.

Shipments were rejected at destination for whatever fault the buyer could find. Many jobbers who had not filled their tanks prior to the advances the first of the month, came into the market soon after crude and tank wagon increases, bought over the month at spot prices, and then saw the market sag ½ to ¾ cent under their purchase prices.

These same jobbers found they could buy from other jobbers or marketers at even lower prices than refiners were asking for spot shipments. Consequently they wiggled out of the hole whenever possible, and left the refiners in many cases with gasoline in transit or at destination, and no place to put it.

(Continued to page 117)

## Barometer of the Mid-Continent Gasoline Market




*Relation of the Group Three price of U. S. Motor Gasoline to Production, Shipments and Stocks of Gasoline at the 124 Mid-Continent plants reporting their figures weekly to National Petroleum News.*

# Autocar construction meets stress of shifting liquid loads

These Model L 5-ton Autocars are part of a fleet of sixty-five Autocars owned by The Freedom Oil Works Company, Freedom, Pa.

A TRUCK equipped with a tank body must be large enough to carry as large a load as possible without a cumbersome amount of overhang.

Autocar short wheelbases, made possible by the distinctive engine-under-the-seat design, allows for carrying this maximum load on a minimum wheelbase. This compact construction results in greater maneuverability in traffic and around oil tanks and gasoline stations.

Autocar more even weight distribution lessens the wear and tear on tires and parts due to the constant shifting of liquid loads in transit.

## The Autocar Company, Ardmore, Pa.

ESTABLISHED 1897

Direct Factory "Autocar Sales and Service" Branches or Affiliated Representatives in

*Albany
*Allentown
Altoona
*Atlanta
*Atlantic City
*Baltimore
Binghamton
*Boston
*Bronx
*Brooklyn
*Buffalo
*Camden
*Canton,O.
*Charlotte
*Chester
*Chicago
*Cleveland
Columbus
*Dallas
Denver
*Detroit
*Erie
*Fall River
*Fresno
*Indianapolis
Jacksonville
*Jersey City
*Lawrence
*Los Angeles
*Memphis
Miami
*Newark
*New Bedford
*New Haven
*New York
*Norfolk
*Oakland
Orlando
*Paterson
*Philadelphia
*Pittsburgh
*Providence
*Reading
*Richmond
*Rochester
*Sacramento
*San Diego
*San Francisco
*San Jose
*Schenectady
Scranton
Shamokin
*Springfield
*St. Louis
*Stockton
*Syracuse
Tampa
Trenton
*Washington
West Palm Beach
*Wheeling
Wilkes-Barre
Williamsport
*Wilmington
*Worcester
York

* Indicates Direct Factory Branch

# Autocar

## gas *and* electric trucks

**EITHER OR BOTH - AS YOUR WORK REQUIRES**

# Refinery Markets on Light Oils and Lubricants

## Pennsylvania, Oklahoma, North and South Texas, Louisiana, Arkansas, California

## GASOLINE AND NAPHTHA

| PENNSYLVANIA | Prices Mar. 1 | Prices Feb. 22 | Prices Feb. 15 |
|---|---|---|---|
| 52-54 Naphtha | 11½-12 | 11¾-12 | 11¾-12 |
| 54-56 Naphtha | 12 -12½ | 12¼-12½ | 12¼-12½ |
| 58-60 Gasoline | 12½-12¾ | 12½-12¾ | 12¾-13 |
| 60-62 Straight-run gasoline | 13¼-14 | 13½-13¾ | 13¾-14 |
| 62-64 Straight-run gasoline | 14 -14¼ | 14¼ 14½ | -14½ |
| 64-66 Straight-run gasoline | 14½-14¾ | 14¾-15¼ | 14¾-15¼ |
| 68-70 Straight-run gas. 350-360 E.P. | 15½-16 | 15¾-16¼ | 15¾-16¼ |
| 68-70 Straight-run gas. 305-320 E.P. | -20 | -20 | -20 |
| 70-72 Straight-run gas. 300-305 E.P. | -21 | -21 | -21 |
| **OKLAHOMA** | | | |
| 48-50 450 E. P. naphtha | 9¼- 9⅜ | 9¼- 9½ | 9¼- 9¾ |
| 50-52 450 E. P. naphtha | 9⅜- 9⅜ | 9¼- 9½ | - 9¾ |
| 56-58 450 E. P. gasoline | 9½- 9¾ | - 9¾ | -10 |
| 56-58 U. S. Motor gasoline | 9¾- 9⅞ | 9¾-10 | 10 -10¼ |
| 58-60 U. S. Motor 437 E. P. | 10 10¼ | 10 -10¼ | 10¼-10¾ |
| 60-62 400 E. P. gasoline | 11½ 11¾ | 11⅜ 12 | 11¾-12⅛ |
| 64-66 390 E. P. gasoline | 12 -12¼ | 12 -12¼ | 12¼-12¾ |
| 64-66 375 E. P. gasoline | 12½ 12¾ | 12½-12¾ | 12½-13 |
| 68-70 350-360 E. P. gasoline | 13¼-13½ | 13¼-13½ | 13½-13¾ |
| 64-66 437 E. P. blend | -10 | -10 | -10½ |
| **KANSAS*** | | | |
| 58-60 U. S. Motor gasoline | -10½ | 10¼-10½ | -11 |
| 60-62 400 E. P. gasoline | 12 -12¼ | 12 -12¼ | 12¾-13 |
| 64-66 375 E. P. gasoline | -13 | -13 | 13 -13¼ |
| *F. O. B. refinery, Kansas destination. | | | |
| **NORTH TEXAS** | | | |
| 48-52 450 E. P. naphtha | 9 - 9¼ | - 9¼ | 9¼- 9½ |
| 56-58 450 E. P. gasoline | 9¼- 9⅜ | 9¼- 9½ | 9¼- 9¾ |
| 58-60 450 E. P. gasoline | 9½- 9⅝ | 9½- 9⅝ | 9¾-10 |
| 56-58 U. S. Motor gasoline | 9½- 9¾ | 9½- 9¾ | 9¾-10 |
| 58-60 U. S. Motor gasoline | 9¾-10 | 9¾-10 | 10 -10¼ |
| 64-66 390 E. P. gasoline | 12 -12¼ | 12¼-12½ | 12¼-12½ |
| 64-66 375 E. P. gasoline | 12¼-12¾ | 12¾-13 | 12¾-13¼ |
| 68-70 350-360 E. P. gasoline | 13 -13¼ | -13¼ | 13½-13¾ |
| **NORTH LOUISIANA** | | | |
| 58-60 U. S. Motor 437 E. P. | 10¼-10½ | 10 -10¼ | -10¾ |
| **ARKANSAS** | | | |
| 58-60 450 E. P. gasoline | 9¾-10 | 9¾-10 | -10 |
| 58-60 U. S. Motor gasoline | 10¼-10½ | -10 | -10½ |
| 64-66 375 E. P. gasoline | 12¾-13¼ | 13 -13¼ | 13 -13¼ |
| **CALIFORNIA** | | | |
| 54-56 U. S. Motor gasoline | -11 | -11 | -11 |
| 42-45 Engine distillate, 445-480 E.P. | 8 - 9 | 8 - 9 | 8 - 9 |

Note: This is without the 2-cent state tax included in the price of California refiners for shipments within the state.

**NEW ENGLAND**
**(F. O. B. Boston and Fall River)**

| | | | |
|---|---|---|---|
| U. S. Motor gasoline | 13 -13¼ | -13⅛ | -13⅛ |

## NATURAL GASOLINE

**(Note: End point of all grades, not over 375° F.)**

| OKLAHOMA | | | |
|---|---|---|---|
| Grade Double A | 9½- 9¾ | 9¾-10 | -10 |
| Grade A | 9½- 9¾ | -10 | -10¼ |
| Grade Double B | 8¾- 9 | - 9 | 9 - 9¼ |
| Grade B | 8¾ 9 | - 9 | 9 - 9¼ |
| Grade C | 8¾- 9 | 8½- 8¾ | 8½- 8¾ |

NOTE—Specifications adopted by Ass'n of Nat. Gaso. Manufacturers
Grade Double A—80-87.9 gravity, 90% recovery, not over 375 E. P.
Grade A—72-79.9 gravity, 90% recovery, not over 375 E. P.
Grade Double B—84-92 gravity, 85% recovery, not over 375 E. P.
Grade B—76-83.9 gravity, 85% recovery, not over 375 E. P.
Grade C—80-90 gravity, 78% recovery, not over 375 E. P.

| NORTH LOUISIANA | | | |
|---|---|---|---|
| Grade Double A | 10½-10¾ | 10½-10¾ | 10¾-11 |
| Grade Double B | 9½- 9¾ | 9½- 9¾ | 9¾-10 |
| Grade C | - 9¼ | - 9¼ | 9¼- 9½ |
| F. O. B. Monroe District. | | | |
| **NORTH TEXAS** | | | |
| *Grade Double A | 9¾-10 | 9¾-10 | 10 -10¼ |
| *Grade A | 9¾-10 | 9¾-10 | 10 -10¼ |
| *Grade Double B | - 9 | - 9¼ | - 9¼ |
| *Grade B | - 9 | - 9¼ | - 9¼ |
| *Grade C | 8¾- 9 | 8¾- 8¾ | 8¾- 9 |
| *F. O. B. Breckenridge. | | | |
| **CALIFORNIA** | | | |
| 73-78° 375 E. P. | 15 -15½ | 15 -15½ | 15 -15½ |
| **PENNSYLVANIA** | | | |
| 68-70 Grav. 437 E. P. | 13 -13¼ | 13½-14 | 13½-14 |
| 64-66 Grav. 437 E. P. | 13 -13¼ | 13½-14 | 13½-14 |
| 60-62 Grav. 437 E. P. | 12¾-13¼ | 13 -13½ | 13 -13½ |
| 68-70 Grav. 420 E. P. | 13½-14 | 14 -14½ | 14 -14½ |

## BURNING OILS

| PENNSYLVANIA | | | |
|---|---|---|---|
| 45 Water White Kerosene | 8¼- 8¾ | 8¾- 9 | 8¼- 8¾ |
| 46 Water White Kerosene | 9¼- 9½ | 9½- 9¾ | 9 - 9¼ |
| 47 Water White Kerosene | -10 | 10 -10¼ | - 9¾ |
| 300 Burning Oil | - 8½ | - 8½ | 8¼- 8½ |
| **OKLAHOMA** | | | |
| 41-43 Water White Kerosene | 6¾- 6⅞ | 6¾- 6⅞ | - 6¾ |
| 42-44 Water White Kerosene | 7 - 7¼ | 7 - 7¼ | 7 - 7¼ |
| **KANSAS** | | | |
| 41-43 w. w. kerosene | - 7¼ | 7 - 7¼ | 6¾- 7 |
| 42-44 w. w. kerosene | - 7½ | - 7½ | 7¼- 7½ |

| NORTH TEXAS | Prices Mar. 1 | Prices Feb. 22 | Prices Feb. 15 |
|---|---|---|---|
| 41-43 Water White Kerosene | 6¾- 6⅞ | 6½- 6¾ | 6½- 6¾ |
| 42-44 Water White Kerosene | - 7¼ | ..... | |
| **NORTH LOUISIANA** | | | |
| 41-43 Water White Kerosene | 7¼- 7½ | 7¼- 7⅜ | 7 - 7½ |
| **ARKANSAS** | | | |
| 41-43 Water White Kerosene | 7 - 7½ | 7 - 7⅝ | 7 - 7½ |
| **CALIFORNIA** | | | |
| 40-42 Water White Kerosene | 5 - 5½ | 5 - 5½ | 5 - 5½ |
| **NEW ENGLAND** | | | |
| 40-43 Water White Kerosene | ..... | ..... | ..... |

## NEUTRAL OIL

| PENNSYLVANIA | | | |
|---|---|---|---|
| **(Viscosity at 70° F.)** | | | |
| 220 Vis. No. 3 Assoc. Filt. | -29½ | -29 | -29 |
| 200 Vis. No. 3 Assoc. Filt. | 27 -27½ | 27 -28 | 26½-27 |
| 180 Vis. No. 3 Assoc. Filt. | 25 -25½ | -25 | 24½-25 |
| 150 Vis. No. 3 Assoc. Filt. | 21 -21½ | 21 -22 | 20½-21 |
| **(Non-Viscous)** | | | |
| 34 Grav. 350-360 Flash | 8½- 8¾ | 8½- 8¾ | 8½- 8¾ |
| 36 Miners Neutrals 300-305 Flash | - 7¾ | - 7¾ | - 7¾ |
| **OKLAHOMA** | | | |
| **(Viscosity at 100° F.)** | | | |
| 100 Vis. No. 2 color | 7 - 7½ | 7 - 7½ | 7 - 7½ |
| 150 Vis. No. 3 color | 10 -11 | 10 -11 | 10 -11 |
| 150 Vis. No. 4 color | - 9¾ | - 9¾ | - 9¾ |
| 180 Vis. No. 3 color | 10 -10¾ | 10 -10¾ | 10 -10¾ |
| 180 Vis. No. 4 color | 10½-11 | 10½-11 | 10½-11 |
| 180 Vis. No. 5 color | 9 -10¼ | 9 -10¼ | 9 -10¼ |
| 200 Vis. No. 3 color | 11 -12 | 11 -12 | 11 -12 |
| 200 Vis. No. 4 color | -11½ | -11½ | -11½ |
| 200 Vis. No. 5 color | 10 -11½ | 10 -11½ | 10 -11¾ |
| 220 Vis. No. 3 color | 12½-12¾ | 12½-12¾ | 12½-12¾ |
| 220 Vis. No. 4 color | 13 -13¼ | 13 -13¼ | 13 -13¼ |
| 220 Vis. No. 5 color | -12¾ | -12¾ | -12¾ |
| 240 Vis. No. 3 color | 14¼-15 | 14¼-15 | 14¼-15 |
| 240 Vis. No. 4 color | -14½ | -14½ | -14½ |
| 240 Vis. No. 5 color | -14 | -14 | -14 |
| 280 Vis. No. 3 color | 15¼-17 | 15¼-17 | 15¼-17 |
| 280 Vis. No. 4 color | -16½ | -16½ | -16½ |
| 280 Vis. No. 5 color | -16 | -16 | -16 |
| 300 Vis. No. 5-6 color | 17 -18½ | 17 -18½ | 17 -18½ |
| **GULF COASTAL** | | | |
| **(Viscosity at 100°F; cold test 0)** | | | |
| 100 Vis. No. 2 Color Unfilt. Pale | 7½- 8 | 7½- 8 | 7½- 8 |
| 200 Vis. No. 3 Color Unfilt. Pale | 11½-12 | 11½-12 | 11½-12 |
| 300 Vis. No. 3 Color Unfilt. Pale | 13½-14 | 13½-14 | 13½-14 |
| 500 Vis. No. 3½ Color Unfilt. Pale | 15½-16 | 15½-16 | 15½-16 |
| 750 Vis. No. 4 Color Unfilt. Pale | 19½-20½ | 19½-20½ | 19½-20½ |
| 200 Vis. No. 5½ Color Red Oil | 10 -10½ | 10 -10½ | 10 -10½ |
| 300 Vis. No. 5½ Color Red Oil | 12 -12½ | 12 -12½ | 12 -12½ |
| 500 Vis. No. 6 Color Red Oil | 13½-14 | 13½-14 | 13½-14 |
| 750 Vis. No. 6 Color Red Oil | 18 -18½ | 18 -18½ | 18 -18½ |
| **CALIFORNIA** | | | |
| **(Viscosity at 100° F.)** | | | |
| 100 Vis. No. 2 color | 11 -11½ | 11 -11½ | 11 -11½ |
| 100 Vis. No. 3 color | 8½- 9 | 8½- 9 | 8½- 9 |
| 200 Vis. No. 3 color | 13½-14 | 13½-14 | 13½-14 |
| 300 Vis. No. 3 color | 15 -15½ | 15 -15½ | 15 -15½ |
| 450 Vis. No. 3½ color | 18 -18½ | 18 -18½ | 18 -18½ |
| 550 Vis. No. 3 color | 20 -21 | 20 -21 | 20 -21 |
| 600 Vis. No. 3½ color | 21 -22 | 21 -22 | 21 -22 |
| 100 Vis. No. 5 color | 7 - 7½ | 7 - 7½ | 7 - 8 |
| 200 Vis. No. 5 color | 12 -12½ | 12 -12½ | 12 -12½ |
| 300 Vis. No. 5 color | 13 -13½ | 13 -13½ | 13 -14 |
| 400 Vis. No. 5 color | 15 -16 | 15 -16 | 15 -16 |
| 500 Vis. No. 5 color | 16 -17 | 16 -17 | 16 -17 |
| 600 Vis. No. 6 color | 17 -18 | 17 -18 | 17 -18 |
| 700 Vis. No. 7 color | 18 -19 | 18 -19 | 18 -19 |

## CYLINDER STOCKS

| OKLAHOMA | | | |
|---|---|---|---|
| 190-210 Vis. at 210° Bright Stock | 31 -35 | 31 -35 | 31 -35 |
| 150-160 Vis. at 210° Bright Stock | 28 -31 | 28 -31 | 28 -31 |
| 600 E Stock, 140-150 Vis. @ 210° | 18 -20 | 18 -20 | 18 -20 |
| 600 Steam Refined Olive Green | 9 -11½ | 9 -11½ | 9 -11½ |
| 600 Steam Refined Dark Green | 6½- 8 | 6½- 8 | 6½- 8 |
| Black Oil | - 5 | - 5 | - 5 |
| **PENNSYLVANIA** | | | |
| **(1-inch Immersion Test)** | | | |
| 600 Steam Refined | 16½-19 | 18 -19 | 18 -19 |
| 635 Steam Refined | 21 -21½ | 21 -22 | 21½-22 |
| 650 Steam Refined | 23 -24 | 22½-23½ | 23½-24 |
| 600 Flash | 26 -27 | 26 -27 | 26½-27 |
| 625 Flash Steam Refined | -36 | -36 | -36 |
| 600 Warren E | 21½-22½ | 21½ 22½ | -22½ |
| 600 Oil City E | -20½ | -20½ | -20½ |
| 600 Filtered D | 27 -28 | 27 -28 | 27 -28 |
| Cold Test Stocks (bright filtered) | 38½-39 | 38½-39 | 38½-39 |
| Cold Test Stock (dark filtered) | 36½-37 | 36½-37 | 36½-37 |
| Black Oil | - 8 | - 8 | - 8 |

(Note—Prices of total immersion test goods average 1 to 3 cents per gallon higher.)

Above prices are f. o. b. refinery in tank car. They are the prices at which the bulk of the products on the open market move. Whoever has knowledge of any open market prices on any considerable quantity of goods differing from the foregoing, will favor us with this information.

Available for
IMMEDIATE SHIPMENT

# 450 Bright Stock

## Sharples Process

## 100% Pennsylvania Crude

Guaranteed 100% PURE PENNSYLVANIA OIL
Permit No. 31

## *Specifications* [1046]

Flash: 450
Fire: 510
Viscosity at 210: 80-85
Gravity: 28
Cold Test: 25-30
Color: No. 7

**This stock can be delivered straight or blended to your specifications with 100% Pennsylvania Crude Neutrals.**

**For shipment in tank cars, compartment tank cars, barrels or drums. For quotation write to**

**The FREEDOM OIL Works Company, Freedom, Pa.**

*Refiners of Pennsylvania Grade Crude for 47 years,*

*Refineries at* Freedom and Coraopolis

Freedom Quality Stocks
600 Steam Refined
635 Steam Refined
650 Steam Refined

Freedom Filtered Neutrals
Freedom 300 Mineral Seal Oil
made to Railroad Specifications
Freedom Filtered Burning Oils

# Refinery Markets on Wax and Heavy Oil Products

## Pennsylvania, Oklahoma, North and South Texas, Louisiana, Arkansas, California

### WAX

| PENNSYLVANIA | Prices Mar. 1 | Prices Feb. 22 | Prices Feb. 15 |
|---|---|---|---|
| (Per Pound, New York) | | | |
| 122-124 White Crude Scale.. | - 5¾ | - 5¾ | - 5¾ |
| 124-126 White Crude Scale.. | - 5½ | - 5½ | - 5½ |
| **OKLAHOMA** | | | |
| (Per Pound, Group 3) | | | |
| 124-126 White Crude Scale.. | 4¾- 5 | 5 - 5¼ | 5 - 5¼ |
| **CALIFORNIA** | | | |
| White Crude Scale..... | 6 - 6¼ | 6 - 6¼ | 6 - 6¼ |

### FUEL OIL

| | | | |
|---|---|---|---|
| **PENNSYLVANIA** | | | |
| 36-40 Fuel Oil..... | 6¼- 6½ | 6 - 6¼ | 6¼- 6½ |
| 30-34 Fuel Oil..... | 5¾- 5¾ | 5¾- 5¾ | 5¾- 5¾ |
| 28-30 Fuel Oil..... | 5¾- 5¾ | 5¾- 5¾ | 5¾- 5¾ |
| **OKLAHOMA** | | | |
| 38-40 Straw distillate..... | 4 - 4¼ | 4 - 4¼ | - 4 |
| 36-38 Straw distillate..... | 3¾- 3¾ | 3¾- 3¾ | 3¾- 3¾ |
| 32-36 Gas oil (Gal.)..... | - 3¾ | - 3¾ | - 3¾ |
| 26-30 Fuel oil (Bbl.).....1.30 -1.40 | | 1.27½-1.30 | 1.27½-1.30 |
| 22-26 Fuel Oil (Bbl.).....1.17½-1.22½ | | 1.17½-1.22½ | 1.17½-1.22½ |
| 18-22 Fuel oil (Bbl.).....1.15 -1.17½ | | 1.15 -1.17½ | 1.15 -1.17½ |
| **KANSAS*** | | | |
| 38-40 Light straw distillate.. | 4¼- 4¼ | 4¼- 4¼ | 4¼- 4½ |
| 36-38 Light straw distillate.. | 4 - 4¼ | 4 - 4¼ | 4 - 4¼ |
| 32-36 gas oil..... | 3¾- 4 | 3¾- 4 | 3¾- 4 |
| 18-22 Fuel oil.....1.20 -1.25 | | 1.17½-1.22½ | 1.20 -1.25 |
| 24-26 Fuel oil.....1.25 -1.30 | | 1.22½-1.30 | 1.25 -1.35 |

*F. O. B. refinery Kansas destination.

| NORTH TEXAS | Prices Mar. 1 | Prices Feb. 22 | Prices Feb. 15 |
|---|---|---|---|
| 36-38 Straw Distillate..... | 3¼- 3¼ | 3¼- 3¼ | 3½- 3¼ |
| 32-36 Gas Oil (Gal.)..... | 3½- 3¾ | 3½- 3¾ | - 3¾ |
| 24-26 Fuel per (Bbl).....1.30 -1.35 | | 1.25 -1.30 | 1.22½-1.30 |
| **GULF COASTAL** | | | |
| Fuel.....1.55 -1.65 | | 1.55 -1.65 | 1.55 -1.65 |
| Gas Oil..... | - 5¼ | - 5¼ | - 5¼ |
| **NORTH LOUISIANA** | | | |
| 32-36 Light Gas Oil (Gal.)... | 3¾- 4 | 3¾- 4 | 3¾- 4 |
| 16-20 Fuel Oil (Bbl.).....1.15 -1.20 | | 1.15 -1.20 | 1.15 -1.20 |
| **ARKANSAS** | | | |
| 32-36 Gas Oil..... | 3¾- 4 | 3¾- 4 | 3¾- 4 |
| Road oil..... | -1.26 | -1.26 | -1.26 |
| Smackover Crude Fuel.....1.15-1.25 | | 1.15 -1.25 | 1.15-1.25 |
| **CALIFORNIA*** | | | |
| 14-18 Fuel Oil (Bbl.)..... | 1.00 | 1.00 | 1.00 |
| 14-18 Bunker Oil (Bbl.)..... | 1.00 | 1.00 | 1.00 |
| 24-30 Gas Oil (Bbl.)..... | 1.15 | 1.15 | 1.15 |
| 27 + Diesel Oil (Bbl.)..... | 1.15 | 1.15 | 1.15 |

*(San Joaquin Valley, San Francisco 4c per bbl. more.)

| NEW ENGLAND (F. O. B. Boston and Fall River) | | | |
|---|---|---|---|
| 30-32 gas oil (gal.)..... | - 5¼ | - 5¼ | - 5¼ |
| Fuel Oil (Bunker C) bbl..... | -1.82½ | -1.83 | -1.83 |

Above prices are f. o. b. refinery in tank car. They are the prices at which the bulk of the products on the open market move. Whoever has knowledge of any open market prices on any considerable quantity of goods differing from the foregoing, will favor us with this information.

(Continued from page 113)

Some of this gasoline is reported to have been offered or turned over to marketers at bargain prices, consequently cheap gasoline was the bear on the market this month.

One Texas refiner reported that he had cancelled 40 cars this month, but added that he had not lost any money, since his customers had promptly sent in checks for the difference in prices requesting cancellations.

### Little Export Buying

A little excitement was stirred up in Oklahoma Wednesday afternoon and Thursday morning when it was reported the Sinclair Refining Co. was inquiring for a large quantity of U. S. Motor gasoline for export. While it is true the inquiry was out, the prices asked by refiners soon convinced the company's Tulsa representative that little goods could be had at even 9¾ cents, and after reporting the situation to headquarters, he was ordered to drop the inquiry.

The company took around 200,000 gallons of gasoline at 64-66, 375 end point gasoline for export early in the week at 12⅝ cents per gallon. The Tulsa office had no purchase order, but the gasoline was virtually laid on the desk at that price, and the purchase was primarily an "accommodation buy."

On the strength of the export inquiry, however, a few marketers are reported to have stepped into the field and bought some gasoline for shipment within the next few days at spot prices.

As for March delivery inquiries, refiners apparently are inclined to hold off a few days to see what is ging to happen. There has been renewed talk of another crude price advance soon, or a major tank wagon change, and this gossip probably accounts in a measure for the reluctance of the refiners to make March quotations before the month actually is here. They say they are receiving the usual number of inquiries from marketers and brokers, but the jobber inquiries are not what they had hoped they would be.

The outlook for March, unless some sort of advance is forthcoming, is not very bright for refiners as a whole. They have a large amount of gasoline in storage and March demands are not normally sufficient to keep up with production.

In a few places criticism was heard of the reluctance of refiners to consider the export inquiry by the Sinclair company. Those who criticised, however, were pessimistic enough to predict U. S. Motor gasoline would go in March even under the price reported offered by the Sinclair agent.

### Texas Refiners Jolted

Most of those who follow the market closely, however, apparently believe a little more jobber demand, a reduction of crude runs, and the continued purchases of goods for export at intervals, even if those purchases are small, will tide the refiners over the month with no more disastrous results than they experienced in February.

Texas refiners have been running along in fair shape, although with the large quantity of export gasoline being cut, the lower gravity grades are piling up with demand slack. The refiners were given a jolt today, however, when the Standard Oil Co. of Louisiana reduced the price of Gulf export gasoline ¼ cent, to 12.15 cents f. o. b. refineries North Texas, and 12.05 Oklahoma refineries. The refiners had been expecting any change made would be upward, since the price of export gasoline along the Atlantic seaboard was raised earlier in the month 1 cent, whereas the gulf price was boosted only ½ cent.

There is much speculation as to what refiners with Standard contracts will do under the present situation, should exporters come into the market offering to buy at spot prices. Many think the refiners will either cut their runs considerably, or will take on some of the spot purchases, and let their shipments under the Standard contracts lag a bit. One or two refiners predicted the reduction was made preparatory to the Standard entering the field for more purchases.

### Naturals in Fair Shape

Natural gasoline manufacturers appear in better shape just now than refiners. While prices are not so high as they have been at this time in years past, the material apparently is moving out about as rapidly as produced.

Grade C came in for a play late this week, due primarily to warmer weather which has made this grade more difficult to make. The price climbed to a level with Grade BB, and many manufacturers shipped the latter grade on Grade C orders. Grades A and AA were draggy for spot shipment, but considerable opposition was met when buyers tried to book orders for delivery the first half of March. There is a feeling in the field that the New Orleans Refining Co. will come into the market again this month as it did last month, and take out around 1000 cars.

# U. S. Motor Gasoline At 10 Cents Is Bottom Price at Chicago

Staff Special

CHICAGO, Feb. 27

TEN-CENT gasoline, U. S. Motor specification, 58-60 gravity was offered freely in the Chicago resale market in the last business days of February. However 10 cents seems to be the bottom price. Quotations of most refiners are firm at a dime and some have been able to get 10¼ cents. In fact one big exporter recently offered 9¾ cents for U. S. Motor and was unable to find sellers. Later, it is reported, he raised that bid to 9⅞ cents and still failed to find a seller at that price.

Reports that U. S. Motor gasoline has been sold at a shade under 10 cents in Chicago have been circulated but, as far as can be determined, the goods sold under 10 cents were not up to generally accepted specifications. Either the gasoline was an undesirable blend of 58-60 gravity or it was a U. S. Motor specification grade of heavier gravity. Nevertheless the market is quiet, but firm at a dime.

Weather conditions throughout Standard Oil Co. of Indiana territory are blamed generally for the weak demand. Motoring in this region is not sufficient to create a demand that will bring the jobber into the spot market to any considerable extent. Marginal contracts offered by major refiners last fall were unusually attractive and a great deal of gallonage is controlled by contract this winter. So when demand falls off, most jobbers are able to meet their requirements with shipments received on contract and possibly build up their stocks a little.

### Weather Might Be Worse

It is true that the weather in Standard Oil Co. of Indiana territory might be worse for motoring than it is now. Only in northern Michigan was zero temperature recorded last week and there were several fair days, but the snow Tuesday night was sufficient to ruin gasoline trade for several days. Wet streets and muddy roads reduced travel greatly. A short period of rains or snows is predicted for early next week and again toward the end. Temperatures will be above normal during the first half of the week and colder toward the end, the weather prophet says.

A general lack of confidence in the March market appears to exist among the re-selling agents in Chicago. Comparatively little speculation is in progress. Jobbers generally are buying for their requirements only. Refiners are neither pushing sales nor boosting prices, and carload marketers are keeping away from speculation in a large degree. A few sales have been made for delivery of gasoline over the first 15 days of March at 10 to 10¼ cents, but even transactions like this are comparatively few.

### Kerosene Is Unchanged

Kerosene prices have not changed enough over the week to make much difference. The 42-44 gravity grade is still obtainable at 7¼ cents, last week's price, although some refiners with a well advertised product are able to collect 7½ cents. Water white goods of 41-43 gravity are still fairly firm at 7 cents a gallon but probably can be had in a little greater quantity at 6⅞ cents now than a week ago. Refiners are not anxious to sell and there is at least a normal seasonable demand. Domestic fuels have strengthened some over the week.

Gas oil prices have continued steady and the demand is fairly firm at 3¾ to 3⅞ cents. Distillate of 38-40 gravity has improved somewhat. Where 4 cents was the almost general quotation a week ago, a great many dealers are asking 4¼ cents now and getting it. The disagreeable weather last week is credited for the firmness of domestic fuel as well as the weakness of gasoline.


PLATT'S

OILGRAM

*Petroleum Markets-Every Day*

**24 Price-changes in February**

**WHEN and where will the next tankwagon or crude change be? Is there a tankwagon advance *today* in another territory which may indicate an advance coming in mine?**

**What are the exact prices at which gasoline and kerosene moved in the past 12 hours? Or lubricating oils, or export prices at the Gulf and New York?**

**You'd know the answer to these questions *this morning*, if you had the OILGRAM on your desk. It's your protection against quick changes in the market situation.**

**If you ever needed to keep in daily contact with the oil markets—IT IS NOW — 24 price-changes in the month of February.**

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**CLEVELAND—834 Caxton Bldg.**


## Week's Price Changes Tank Wagon Markets

### Gasoline Changes

**Standard of New Jersey**—The 1 cent advance in gasoline prices in S. C., N. C., and Va., and ½ cent in W. Va., was effective **Feb. 22**, instead of Feb. 23, as some of the Feb. 24 issues of National Petroleum News stated, before correction was made on the press.

**Standard of New York**—Gasoline prices at Burlington, Vt. have been incorrect in the tank wagon table since **Dec. 17.** Since that date they should have been shown at 18 cents tank wagon, without 2 cent road tax, 20 cents tank wagon with tax, and 22 cents service station.

**Standard of Kentucky**—The 1 cent general advance on **Feb. 15** included a 3 cent advance on gasoline at Savannah and a 2 cent advance at Lexington. All prices are corrected in this week's table.

**Standard of Louisiana**—T. w. and s. s. prices reduced ½ cent, Louisiana and Arkansas, **Feb 27.**

**Continental Oil**—S. s. price only at Denver reduced 2 cents, to 20 cents, **Feb. 24,** making both t. w. and s. s. prices 20 cents, including tax. S. s. price only at Pueblo reduced 2 cents, to 19 cents, Feb. 23, making both t. w. and s. s. prices 19 cents, including tax.

### Kerosene Changes

**Standard of Kentucky**—In the 1 cent general advance in kerosene prices on **Feb. 12** in Georgia, Alabama, Florida and Kentucky, and 1½ cent general advance in Mississippi, Augusta was advanced 1½ cents; Macon, Ga. 2½ cents; Mobile and Louisville, 2 cents.

## Correction

Prices on Grades A and AA natural gasoline in North Texas on Jan. 25 in the Jan. 27 and Feb. 3 issues of National Petroleum News should have been 9 to 9½ cents, instead of 9½ to 9⅞ cents. These prices were corrected in the Feb. 10 issue, in the Jan. 25 column.

## Foreign Opportunities

Reserved information may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, and its district and cooperative offices by duly registered firms and individuals upon written request by opportunity number. The Bureau does not furnish credit ratings or assume responsibility as to the standing of foreign inquirers; the usual precautions should be taken in all cases, and where no references are offered it does not necessarily imply that satisfactory references could not be given. Correspondence may be in English unless otherwise stated.

19344.—**Lubricating oils and greases,** Cario, Egypt, agency.

19353.—**Asphalt and petroleum coke,** Berlin, Germany, agency.

19265.—**Asphalt,** Iquique, Chile, purchase.

19373.—**Paraffin chips and match wax,** Vienna, Austria, purchase.

# Tank Wagon, Service Station Markets for Gasoline and Kerosene In United States Territories and Canada

BELOW are given in cents a gallon, the tank wagon price of gasoline without the special taxes levied against motor fuels by many states, the amount of the state taxes, the total tank wagon price, with tax added in and the service station or retail price of gasoline as quoted by the Standard Oil Companies in their various marketing territories. The right hand column is the tank wagon price of kerosene. By tank wagon price is meant the price to resale agents or dealers.

**These Prices in Effect March 1, 1926**

## S.O. NEW JERSEY TERRITORY

| | Gasoline T.W. | Tax | Total | S.S. | Oil T.W. |
|---|---|---|---|---|---|
| Atlantic City, N. J. | 16 | 0 | 16 | * | 15 |
| Newark, N. J | 16 | 0 | 16 | 18 | 15 |
| Annapolis, Md. | 16 | 2 | 18 | * | 15 |
| Baltimore, Md. | 16 | 2 | 18 | 21 | 15 |
| Cumberland, Md. | 16 | 2 | 18 | 21 | 15 |
| Washington, D. C. | 16 | 2 | 18 | 21 | 15 |
| Danville, Va. | 17 | 3 | 20 | * | 15 |
| Norfolk, Va. | 17 | 3 | 20 | 23 | 15 |
| Richmond, Va. | 17 | 3 | 20 | 23 | 15 |
| Roanoke, Va. | 17 | 3 | 20 | 23 | 15 |
| Petersburg, Va. | 17 | 3 | 20 | * | 15 |
| Williamsburg, Va. | 17 | 3 | 20 | * | 15 |
| Charleston, W.Va. | 16.5 | 3½ | 20 | 23 | 15 |
| Clarksburg, W.Va. | 16.5 | 3½ | 20 | 23 | 15 |
| Keyser, W.Va. | 16.5 | 3½ | 20 | * | 15 |
| Parkersburg, W.Va. | 16.5 | 3½ | 20 | 23 | 15 |
| Wheeling, W.Va. | 16.5 | 3½ | 20 | 23 | 15 |
| Charlotte, N. C. | 17 | 4 | 21 | 24 | 15 |
| Hickory, N. C. | 17 | 4 | 21 | * | 15 |
| High Point, N. C. | 17 | 4 | 21 | * | 15 |
| Mt. Airy, N. C. | 17 | 4 | 21 | * | 15 |
| Salisbury, N. C. | 17 | 4 | 21 | * | 15 |
| Charleston, S. C. | 17 | 5 | 22 | 25 | 15 |
| Columbia, S. C. | 17 | 5 | 22 | 25 | 15 |

*Dealers set own prices. S.O. New Jersey does not operate station.

## S. O. NEW YORK

| | | | | | |
|---|---|---|---|---|---|
| *New York City | 18 | 0 | 18 | 22 | 16 |
| Albany, N. Y. | †18 | 0 | †18 | †20 | 16 |
| Buffalo, N. Y. | 17 | 0 | 17 | 20 | 16 |
| Rochester, N. Y. | †17 | 0 | †17 | †21 | 14 |
| Syracuse, N. Y. | 18 | 0 | 18 | 20 | 15 |
| Boston, Mass. | 18 | 0 | 18 | 21 | 16 |
| Augusta, Me. | 18 | 3 | 21 | 24 | 16 |
| Manchester, N. H. | 18 | 2 | 20 | 24 | 16 |
| Burlington, Vt. | 18 | 2 | 20 | 22 | 16 |

*In steel barrels.

†At Rochester and Albany, Standard sells two grades of gasoline, the above price applying to its Socony grade, and another grade being sold 2c below this price.

## ATLANTIC REFINING

| | | | | | |
|---|---|---|---|---|---|
| Pittsburgh, Pa. | 17 | 0 | 17 | *22 | 16 |
| Philadelphia, Pa. | 17 | 0 | 17 | *22 | 16 |
| Allentown, Pa. | 17 | 0 | 17 | *22 | 16 |
| Erie, Pa. | †17 | 0 | †17 | *20 | 16 |
| Scranton, Pa. | 17 | 0 | 17 | *22 | 16 |
| Altoona, Pa. | 17 | 0 | 17 | *22 | 16 |
| Dover, Del. | 17 | 2 | 19 | 22 | 16 |
| Wilmington, Del. | 17 | 2 | 19 | 22 | 16 |
| Providence, R. I. | 18 | 1 | 19 | 22 | 16 |
| Springfield, Mass. | 18 | 0 | 18 | 20 | 16 |
| Worcester, Mass. | 18 | 0 | 18 | 20 | 16 |
| Hartford, Conn. | 18 | 2 | 20 | 23 | 15 |
| New Haven, Conn. | 18 | 2 | 20 | 23 | 16 |
| Boston, Mass. | 18 | 0 | 18 | 21 | 16 |

*Contains 2-cent tax collected by retail dealer and paid by him directly to state.

†While the Atlantic Refining Co. quotes 17c as the tank wagon market at Erie, it is understood sales are still being made at as much as 2 cents under this figure as for the past few weeks, due to local price disturbance.

## S. O. KENTUCKY

| | | | | | |
|---|---|---|---|---|---|
| Lexington, Ky. | 17 | 5 | 22 | 25 | 16 |
| Louisville, Ky. | 18 | 5 | 23 | 26 | 15 |
| Covington, Ky. | 18 | 5 | 23 | 26 | 16 |
| Clarksdale, Miss. | 17 | 3 | 20 | 23 | 14.5 |
| Jackson, Miss. | 17 | 3 | 20 | 23 | 13.5 |
| Natchez, Miss. | 16.5 | 3 | 19.5 | 22.5 | 14 |
| Vicksburg, Miss. | 16.5 | 3 | 19.5 | 22.5 | 14 |
| Birmingham, Ala. | 18 | 2 | 20 | 23 | 16.5 |
| Mobile, Ala. | 17 | 2 | 19 | 22 | 15 |
| Montgomery, Ala*. | 19 | 2 | 21 | 24 | 17.5 |
| Atlanta, Ga. | †19 | 3½ | 23 | 26 | 17 |
| Augusta, Ga. | †19 | 3½ | 23 | 26 | 16.5 |
| Macon, Ga. | †19 | 3½ | 23 | 26 | 17 |
| Savannah, Ga. | †16 | 3½ | 20 | 23 | 15 |
| Jacksonville, Fla. | 17 | 4 | 21 | 24 | 15 |
| Miami, Fla. | 19 | 4 | 23 | 26 | 16.5 |
| Tampa, Fla. | 17 | 4 | 21 | 24 | 15 |
| Pensacola, Fla. | 17 | 4 | 21 | 24 | 15.5 |

*Local privilege tax of 1 cent on gasoline and ½ cent on kerosene at Montgomery included.

†Georgia has ½ cent per gal. inspection fee on gasoline which is deducted as well as the state gasoline road tax of 3½ cents, to get the actual net tank wagon market to dealer.

## S. O. INDIANA

| | Gasoline T.W. | Tax | Total | S.S. | Oil T.W. |
|---|---|---|---|---|---|
| Chicago, Ill. | †17 | 0 | †17 | 19 | 12 |
| Decatur, Ill. | 17.2 | 0 | 17.2 | 19.2 | 12.5 |
| E. St. Louis, Ill. | 16.1 | 0 | 16.1 | 18.35 | 11.6 |
| Joliet, Ill. | 17.4 | 0 | 17.4 | 19.4 | 12.7 |
| Peoria, Ill. | 17.2 | 0 | 17.2 | 19.2 | 12.5 |
| Quincy, Ill. | 17.2 | 0 | 17.2 | 19.2 | 12.5 |
| Indianapolis, Ind. | 17.2 | 3 | 20.2 | 22.2 | 12.7 |
| Evansville, Ind. | 17 | 3 | 20 | 22 | 12.5 |
| South Bend, Ind. | 17.4 | 3 | 20.4 | 22.4 | 12.9 |
| Detroit, Mich. | 17.8 | 2 | 19.8 | 21.8 | 13.2 |
| Grand Rapids, Mich. | 17.7 | 2 | 19.7 | 21.7 | 13.1 |
| Saginaw, Mich. | 17.9 | 2 | 19.9 | 21.9 | 13.3 |
| Madison, Wis. | 17.3 | 2 | 19.3 | 21.3 | 12.5 |
| Milwaukee, Wis. | 17.1 | 2 | 19.1 | 21.1 | 12.3 |
| La Crosse, Wis. | 18.2 | 2 | 20.2 | 22.2 | 13.4 |
| Minneapolis, Minn. | 18.2 | 2 | 20.2 | 22.2 | 13.6 |
| Duluth, Minn. | 18.5 | 2 | 20.5 | 22.5 | 13.6 |
| Mankato, Minn. | 18.1 | 2 | 20.1 | 22.1 | 13.4 |
| Des Moines, Iowa. | 17.5 | 2 | 19.5 | 21.5 | 12.9 |
| Davenport, Iowa. | 17.5 | 2 | 19.5 | 21.5 | 12.9 |
| Sioux City, Iowa. | 17 | 2 | 19 | 21 | 12.5 |
| Mason City, Ia. | 17.5 | 2 | 19.5 | 21.5 | 12.9 |
| St. Louis, Mo. | **16.6 | 2 | 18.6 | 20.9 | 12 |
| Kansas City, Mo. | ††17.9 | 2 | 19.9 | 21.9 | 11.3 |
| St. Joseph, Mo. | **17 | 2 | 19 | 21 | 11.9 |
| Fargo, N. D. | 19.9 | 1 | 20.9 | 22.9 | 15.6 |
| Grand Forks, N.D. | 20.2 | 1 | 21.2 | 23.2 | 15.9 |
| Minot, N. D. | 19.9 | 1 | 20.9 | 22.9 | 15.6 |
| Pierre, S. D. | 15 | 3 | 18 | * | 14.1 |
| Huron, S. D. | 16 | 3 | 19 | 21 | 14.1 |
| Wichita, Kans. | 16.3 | 2 | 18.3 | 21.3 | 11.8 |
| Bartlesville, Okla. | 14.4 | 3 | 17.4 | 19.4 | 10.9 |

†Dumps of 100 or more gallons at 16c per gallon.
*S. O. Indiana does not operate station.
**Includes city tax of ½c.
††Includes city tax of 1c.

## S. O. NEBRASKA

| | | | | | |
|---|---|---|---|---|---|
| Crawford, Neb. | 18 | 2 | 20 | * | 13.25 |
| Omaha, Neb. | 16.25 | 2 | 18.25 | 20.25 | 12.5 |
| McCook | 18.75 | 2 | 20.75 | 22.75 | 14 |
| Norfolk | 17.75 | 2 | 19.75 | 21.75 | 13 |
| North Platte | 18.75 | 2 | 20.75 | 22.75 | 13.75 |
| Scottsbluff | 18.25 | 2 | 20.25 | 22.25 | 13.25 |

*Standard has no service station here.

## CONTINENTAL OIL

| | | | | | |
|---|---|---|---|---|---|
| Denver, Colo. | 18 | 2 | 20 | 20 | 15.5 |
| Pueblo, Colo. | 17 | 2 | 19 | 19 | 15.5 |
| Casper, Wyo. | 18 | 2½ | 20.5 | 22.5 | 14 |
| Cheyenne, Wyo. | 19 | 2½ | 21.5 | 23.5 | 15.5 |
| Butte, Mont. | 20 | 2 | 22 | 22 | 17 |
| Helena, Mont. | 22 | 2 | 24 | 26 | 18 |
| Salt Lake City, Utah. | 20 | 3½ | 23.5 | 25.5 | 18 |
| Boise, Ida. | 22 | 3 | 25 | 27 | 20 |
| Albuquerque, N.M. | 21.5 | 3 | 24.5 | 27.5 | 17.5 |

## S O. CALIFORNIA

| | | | | | |
|---|---|---|---|---|---|
| Phoenix, Ariz. | 20 | 3 | 23 | 26 | 21.5 |
| Los Angeles, Cal. | 10.5 | 2 | 12.5 | 18.5 | 15.5 |
| Fresno, Cal. | 14.5 | 2 | 16.5 | 20.5 | 17.5 |
| San Francisco, Cal. | 14 | 2 | 16 | 20 | 15.5 |
| Reno, Nev. | 17.5 | 4 | 21.5 | 25.5 | 19 |
| Portland, Ore. | 14 | 3 | 17 | 21 | 16.5 |
| Seattle, Wash. | 14 | 2 | 16 | 20 | 16.5 |
| Spokane, Wash. | 18 | 2 | 20 | 24 | 20.5 |
| Tacoma, Wash. | 14 | 2 | 16 | 20 | 16.5 |

## S. O. LOUISIANA

| | | | | | |
|---|---|---|---|---|---|
| Little Rock, Ark. | 14.5 | 4 | 18.5 | 21.5 | 14.5 |
| Alexandria, La. | 14.5 | 2 | 16.5 | 19.5 | 14.5 |
| Baton Rouge, La. | 15.5 | 2 | 15.5 | 18.5 | 13 |
| Lake Charles, La. | 15 | 2 | 17 | 20 | 14.5 |
| New Orleans, La. | *15 | 2 | 17 | 20 | 13.5 |
| Shreveport, La. | 13.5 | 2 | 15.5 | 18.5 | 13.5 |
| Lafayette, La. | 15.5 | 2 | 17.5 | 19.5 | 14 |
| Bristol, Tenn. | 16.5 | 3 | 19.5 | 22.5 | 15 |
| Chattanooga, Tenn. | 15.5 | 3 | 18.5 | 21.5 | 15 |
| Knoxville, Tenn. | 16 | 3 | 19 | 22 | 15.5 |
| Nashville, Tenn. | 15.5 | 3 | 18.5 | 21.5 | 15 |
| Memphis, Tenn. | 15 | 3 | 18 | 21 | 14.5 |

*Includes 1c city tax on gasoline and kerosene.

## S. O. OHIO

| | Gasoline T.W. | Tax | Total | S.S. | Oil T.W. |
|---|---|---|---|---|---|
| All Ohio points | 19 | 2 | 21 | 23 | 15 |

## MAGNOLIA PETROLEUM

| | | | | | |
|---|---|---|---|---|---|
| Muskogee, Okla. | 17 | 3 | 20 | 23 | 10 |
| Oklahoma City | 17 | 3 | 20 | 23 | 12 |
| Tulsa, Okla. | 13 | 3 | †16 | 19 | 12 |
| Fort Smith, Ark. | 15 | 4 | 19 | 22 | 14.5 |
| Little Rock, Ark. | 15 | 4 | 19 | 22 | 14.5 |
| Texarkana, Ark*. | 17 | 4 | 21 | 24 | 13 |
| Dallas, Tex. | 15 | 1 | 16 | 20 | 12 |
| El Paso, Tex. | 18 | 1 | 19 | 20 | 13 |
| Fort Worth, Tex. | 14 | 1 | 15 | 17 | 11 |
| Houston, Tex. | 16 | 1 | 17 | 20 | 12 |
| San Antonio, Tex. | 15 | 1 | 16 | 17 | 11 |

*Within city of Texarkana, Ark., the state tax on gasoline is 1c per gal. conforming with the Texas state tax. In Texarkana district outside of the city the 4c state tax applies.

†16c to regular power trade. 18c to all other tank wagon consumers.

## V. M. & P. NAPHTHA

(Changes ordinarily occur coincident with gasoline)

| | Oleum Spirits | V.M.&P. Naphtha | Cleaners Naphtha |
|---|---|---|---|
| Chicago | 19 | 21 | 21 |
| Detroit | 20 2 | 22 7 | 22.7 |
| Kansas City | 19.2 | 21.2 | 21.2 |
| Milwaukee | 19.2 | 23.7* | 23.7* |
| Minneapolis | 20.5 | 25* | 25* |
| St. Louis | 18.4 | 20.9 | 22.2 |
| New York | | 18 | .... |

*Including state tax.

# CANADA

(Per Imperial Gallon, which is 1.2 American Gallons)

### ONTARIO

| | Gasoline T.W. | Tax | Total | S.S. | Oil T.W. |
|---|---|---|---|---|---|
| Toronto | 24.5 | 3 | 27.5 | 31 | 20 |
| Ottawa | 25.5 | 3 | 28.5 | 32 | 21 |
| Cochrane | 29.5 | 3 | 32.5 | 36 | 24.5 |
| Ft. William | 28.5 | 3 | 31.5 | 35 | 22.5 |

### MANITOBA

| | | | | | |
|---|---|---|---|---|---|
| Winnipeg | 28.5 | 3 | 31.5 | 35 | 22.5 |

### SASKATCHEWAN

| | | | | | |
|---|---|---|---|---|---|
| Regina | 31.5 | 0 | 31.5 | 35 | 25.5 |

### ALBERTA

| | | | | | |
|---|---|---|---|---|---|
| Edmonton | 32.5 | 2 | 34.5 | 38 | 27.5 |
| Calgary | 30.5 | 2 | 32.5 | 36 | 26.5 |

### BRITISH COLUMBIA

| | | | | | |
|---|---|---|---|---|---|
| Vancouver | 22 | 3 | 25 | 29 | 23 |

### QUEBEC

| | | | | | |
|---|---|---|---|---|---|
| Montreal | 24.5 | 3 | 27.5 | 31 | 20 |
| Quebec City | 26.5 | 3 | 29.5 | 33 | 22 |
| Three Rivers | 26.5 | 3 | 29.5 | 33 | 22 |

### NEW BRUNSWICK

| | | | | | |
|---|---|---|---|---|---|
| St. John | 27.5 | 0 | 27.5 | 32 | 25 |
| Moncton | 27.5 | 0 | 27.5 | 32 | 25 |

### NOVA SCOTIA

| | | | | | |
|---|---|---|---|---|---|
| Halifax | 27.5 | 3 | 30.5 | 35 | 25 |
| Sydney | 29.5 | 3 | 32.5 | 33 | 25 |

### PRINCE EDWARD ISLAND

| | | | | | |
|---|---|---|---|---|---|
| Charlottetown | 27.5 | 2 | 29.5 | 34 | 23 |

Note: In districts surrounding these points 1c additional is added to city price.

# Complete Export Markets

New York | Gulf Coast | California

# Kerosene Export Prices Advanced Gasoline Quiet But Steady

NEW YORK, March 1

ADVANCES in bulk kerosene prices brought about by diminishing supplies featured both the New York and Gulf markets last week. Gasoline was steady but quiet. Recent heavy export buying of gas oil strengthened this oil considerably. Waxes were weak. Cylinder stocks were firmer at New York.

Gulf refiners appeared more anxious to move U. S. Motor gasoline but foreign demand lagged although numerous bulk inquiries were in the market. United Kingdom buyers who have been quiet for several weeks are again inquiring. The advance in gasoline tank wagon prices in Virginia and the Carolinas is looked upon by New York oil men as the forerunner of another general advance throughout the east.

### *Gasoline—New York*

Export demand for U. S. Motor gasoline was light although inquiries for mixed cargoes were numerous. One of the big Independents is working on two calls for 45,000 barrels each of U. S. Motor and 64-66 gravity gasoline, and prime and water white kerosene for March-April shipment to the United Kingdom. At New York harbor refineries U. S. Motor was held at 12½ cents a gallon. Some nearby refiners are asking 12¾ a gallon. There was an inquiry from France for 40,000 barrels of U. S. Motor and 64-66 gravity gasoline but this is pending. The market for cased gasoline was quiet. South American buyers are purchasing cautiously. One of the Independents reported the sale of 30,000 cases of U. S. Motor and 64-66 gravity gasoline for March shipment to the Far East.

### *Gasoline—Gulf Ports*

One of the leading Independents is working on two inquiries from the United Kingdom for 40,000 barrels of U. S. Motor and 61-63 gravity gasoline along with water white kerosene for March-April shipment. This factor is asking 11¾ cents for Motor 14¼ to 14½ cents for 61-63 gravity and 8¾ cents for water white. A leading refiner is reported to be working on two cargoes of U. S. Motor and 61-63 gravity gasoline for March shipment to France calling for 45,000 barrels each. It is understood that one of these has been closed.

U. S. Motor was easier and prices ranged from 11½ to 12 cents a gallon and 64-66 ranged from 14¾ to 15 cents. Cased gasoline was slightly easier with Motor at $2.25 a case and 64-66 at $2.40 a case in cargo lots. A Japanese buyer is reported after 40,000 cases for April shipment.

### *Gasoline—Domestic*

California gasoline laid down at New York is still quoted at 12½ cents a gallon. Jobbing demand has been light, and the price in tank cars delivered to the trade ranged from 13½ to 13¾ cents a gallon. However, the advance in gasoline tank wagon prices in the Carolinas and Virginia have led to the belief that there will be a general advance in this territory shortly.

At the Gulf U. S. Motor was quoted at 11¾ cents a gallon, f. o. b. Westwego, to the jobbing trade.

### *Kerosene— New York*

There has been a scarcity of kerosene offerings and only two New York refiners appeared in a position to take on cargoes. Stocks are low and bulk water white was raised ½ cent a gallon to 10 cents f. o. b. refinery, while prime white is virtually unobtainable below 9 cents a gallon, or 2 cents above the Gulf quotation. Export buyers are more interested in kerosene but are not inclined to pay current prices. Cased kerosene did not show any change. There was an inquiry from the Near East for 20,000 cases of water and prime for March shipment which is still pending. A Scandinavian buyer was inquiring for 25,000 barrels of water and prime white kerosene for March shipment but this was in the nature of a "feeler."

### *Kerosene—Gulf Ports*

Prices were quoted on a wide range. Most of the refiners were not in a position to consider cargo inquiries. Water white ranged from 8 to 8¾ cents a gallon while prime was quoted at from 7 to 7¾ cents a gallon, bulk. Stocks are greatly depleted, and the trade looks for higher prices shortly. The majority of Independents are finding all they can do to take care of present business.

Cased kerosene was again marked up 5 cents, reflecting the strength in bulk goods. Cased water white is held at $1.80 and prime is quoted at $1.70, in cargo lots. An inquiry was received for 15,000 cases of prime and water white for March shipments to South America, and it is understood that one of the big Independents booked this.

### *Kerosene—Domestic*

Jobbing demand is unusually good. There has been a steady movement into export channels and as stocks are depleted, jobbers are finding difficulty in obtaining offers. On Friday Sinclair advanced water white ½ cent a gallon, at Atlantic seaboard terminals and is now asking 10 cents a gallon. Comparatively little prime white is being offered and this is held at 9 cents a gallon or 10 cents delivered to the trade in tank car lots.

### *Gas Oil—New York*

Demand for 36-40 gas oil is more active. Price is firm at 6 to 6½ cents a gallon at refineries. No export buying was reported but domestic demand is gaining. Prospects of a great deal of cracking next spring and summer have also tended to improve sentiment. For 28-34 the asking price is 5½ cents a gallon, refinery.

### *Gas Oil—Gulf Ports*

Considerable export business that had been transacted the previous week, came to light last week. As a result prices are firmer. One refiner sold two cargoes of 35,000 barrels each for March shipment to Europe while another closed 40,000 barrels for March shipment probably to the United Kingdom. There was an inquiry late last week for 40,000 barrels of 32 plus gravity light gas oil for March shipment to continental Europe. The price for 26-28 transparent gas oil ranged from 4¾ to 5¼ cents while 32 plus dark was quoted from 4⅝ to 5 cents.

### *Waxes—New York*

Continued dullness dominated the New York wax market. There has been little export buying and prices are easier. Domestic demand is still strictly hand to mouth. Offerings of white crude scale were more numerous and 122-124 A. m. p. was offered freely at 5¼ cents while 124-126 A. m. p. semi-refined attracted little attention at 5 3/8 cents. Fully refined waxes were more or less neglected, and reports current had it that 133-135 could have been had at 6½ cents on a firm bid but buyers showed little interest even at this figure. For 120-122 A. m. p. fully refined the price was still held at 6 cents.

### *Waxes—Gulf Ports*

Export orders were confined to five and ten-ton lots. White crude scale 124-126 A.m.p. was offered freely at 5¼ cents while semi-refined 124-126 was quoted at 5⅜ cents. Buyers with export connections are showing little interest in either spot or futures. The market for fully refined wax was stag-

nant and 125-127 was unchanged at 5.90 f.o.b. New Orleans while 128-30 was quoted at 6 cents and 133-135 was held at 6¼ cents.

### *Lubricants—New York*

Demand was spasmodic and light although prices for cylinder stocks were a shade firmer. No export buying of consequence developed, being confined to a few hundred barrels for nearby shipment to France. Pennsylvania 600 steam refined in barrels, New York, was held at 25 to 26 cents with little available below the inside price. Western 600 steam refined is held at 14 cents a gallon. Neutral oils were quiet.

### *Lubricants—Gulf Ports*

Demand for zero cold test oils is still lagging but prices have not undergone any change to speak of. An inquiry for a cargo of 30,000 barrels of assorted lubricants for March shipment to France is pending. Refiners are reticent to make concessions. Stocks are moderate and the trade looks for better domestic demand shortly. There is a fair shipment abroad against standing contracts.

### *Bunker Oil—New York*

Grade C is firm at $1.75 a barrel f.o.b. refinery. The Washington's birthday holiday had a quieting effect on this market and little new business developed. The movement is mainly against contracts. Diesel oil demand is a shade more spirited and all large refiners are asking $2.20 a barrel f.o.b. New York harbor refineries. Ending of the anthracite coal strike has failed to depress the heavy fuel oils.

### *Bunker Oil—Gulf Ports*

In cargo lots, at New Orleans grade C was held at $1.50 a barrel, while for bunkering purposes the price was steady at $1.60 a barrel. Demand from the domestic trade is more active but foreign buyers are holding off. At Tampico the price was $1.45 a barrel, in cargoes, taxes included. Heavy Mexican crude oil was steady at $1.15 a barrel, in cargoes, f.o.b. Tampico, taxes to be added.

### *Petrolatums*

Export interest was keener. British buyers are operating a little more extensively and all grades were steady. Snow white was generally quoted at from 11¼ to 11½ cents a pound while lily white was held at 8½ cents. French makers of toilet preparations have been inquiring more actively and a better demand from this source is expected soon.

### Gulf Coast More Optimistic

HOUSTON, March 1.—Better feeling concerning the immediate future of the Gulf Coastal lubricant market is felt although conditions are unchanged from a week ago and manufacturers report the market has not fully recovered from recent weak spots. Prices to the domestic trade in tank car lots are steady. No new commitments for export are reported although quotations below tank car prices have been made on bulk cargo inquiries.

# New York Export Market

Prices below are an index to the export markets as of the dates given. In many cases they are actual sales prices. So many factors enter into the price in export transactions that an actual market price governing the bulk of transactions cannot be given.

| GASOLINE | Mar. 1 | Feb. 22 |
|---|---|---|
| U. S. Motor. Tank cars Ref.... | 12½-12¾ | -12½ |
| U. S. Motor cases..... | 28.15 | -28.15 |
| California grade U. S. Motor F. O B. N. Y. Bulk..... | 12½ | -12½ |
| **KEROSENE** | | |
| 41-43-150 W. W. Tank cars Ref. | 10 | -09½ |
| 41-43-150 W. W. Cases..... | 19.90 | -19.90 |
| 42-44-110 S. W. Cases..... | 18.40 | -18.40 |
| **GAS OIL** | | |
| 36-40, Bulk Refinery..... | -06 06¼ | -06½ |
| 28-34, Bulk Ref ..... | -05½ 05¾ | -06¼ |
| **MEXICAN BUNKER OIL** | | |
| Grade C, f. o. b. ref.. Bulk.... | 1.75 | -1.75 |
| Diesel Oil f. o. b. ref.. Bulk.... | 2.30 | -2.20 |

**LUBRICATING OILS**

The following prices are cooperage basis f. o. b. New York, products being manufactured by inland refineries.

| CYLINDER OILS (bbls.) 1 inch Immersion Test; All Penna. Products | | |
|---|---|---|
| Filtered D 600..... | 32 | -32 |
| Filtered E 600..... | 30 | -30 |
| Unfiltered 600 s. r..... | 25 | -25 |
| Unfiltered 650 s. r..... | 30 | -30 |
| 600 flash s. r..... | 32 | -32 |
| 650 Flash..... | 42 | -42 |
| **RED PARAFFIN (bbls.)** (Viscosity at 70) | | |
| 300 vis.....No. 5 color | 21½ | -21½ |
| 250 vis.....No. 5 color | 20½ | -20½ |
| High Viscosity.....No. 5 color | 26 | -26 |
| **Neutral Oils (bbls.)** (Viscosity at 70) | | |
| 200 vis. at F. Pale..No. 5 color | -31½ | -31½ |
| 180 Pale.....No. 5 color | -30 | -29½ |
| 150 Pale.....No. 5 color | -24¾ | -24¾ |
| **BLACK OIL (bbls.)** | | |
| 25-30 cold test..... | 14 -15 14 | -15 |
| 15 cold test..... | 15 -15½ 15 | -15½ |

**MEDICINAL OILS**
(Includes Price of Drums)
(Penna. Stocks)

| | Mar. 1 | Feb. 22 |
|---|---|---|
| Domestic.875-.885s.g.....1.00-1.08 | | 1.00-1.08 |
| Domestic.865-.870s.g..... .75- .80 | | .75- .80 |
| Russian.885-.890s.g.325-350 vis. .....1.20-1.25 | | 1.20-1.25 |

**WAXES**
(Penna. Stocks)
(F. A. S. Carload Lots)

| WHITE CRUDE SCALE | | |
|---|---|---|
| 122-124 A. m. p..... | -05¼ | -05¼ |
| 124-126 A. m.p..... | -05¾ | -05¾ |
| **MATCH** | | |
| 105-108 A. m. p..... | -06 | -06 |
| **FULLY REFINED** | | |
| 120-122 A. m. p.....06 | | -06 |
| 123-125 A. m. p. Philadelphia 06¼ | | -06¼ |
| 125-127 A. m. p..... 06¾ | | -06¾ |
| 128-130 A. m. p..... 06¾ | | -06¾ |
| 130-132 A. m. p.....06¾ | | -06¾ |
| 133-135 A. m. p.....06¾ | | -06¾ |
| 135-137 A. m. p..... | -07¼ | -07¼ |
| **SEMI REFINED** | | |
| 122-124 A. m. p..... | -05¾ | 05¾ |
| **YELLOW CRUDE SCALE** | | |
| 124-126 A. m. p.....05¼ | | -05¼ |

**PETROLATUMS**
(Penna. Stocks)
Per Pound

| | | |
|---|---|---|
| Dark Green..... | 08¾ | 08¾ |
| Veterinary..... | 03¾ | 05¼ |
| Light Amber..... | 03¾ | 03¾ |
| Dark Amber..... | 03¾ | 03¾ |
| Cream..... | 06¾ | 06¾ |
| Lily White..... | 08¼ | 08¾ |
| Snow White.....11 | -11½ 11 | 11½ |

# Gulf Export Market

**Gasoline**
F. O. B. Seaboard
Shipments of 20,000 Bbls. and over

| | Mar. 1 | Feb. 22 |
|---|---|---|
| U. S. Motor, Cargo.....11¼-.12 | 11¾-.12 | |
| 60-62 400 e. p. Bulk..... | .13¾ | .13¼ |
| 64-66, 385 e. p. Bulk.....14¾- 15 | 14¾-.15 | |
| U S. Motor, Cases (cargo lots).. | 2.25 | 2.25 |
| 64-66, Cases (cargo lots)..... | 2.40 | 2.40 |
| **KEROSENE** | | |
| Water White, 41-43 bulk.... 08 | -08¾ 08¼ | -08¾ |
| Prime White, 42-44 bulk.....07 | -07¾ 07¼ | 07¾ |
| Water White, cases (cargo lots) | 1.80 | -1.75 |
| Prime White, cases (cargo lots) | 1.70 | -1.65 |
| **DOMESTIC GAS AND BUNKER OIL** | | |
| 26-28, gravity, bulk*..... | 04¾-05¼ | -05 |
| 32 plus, bulk, Dark..... | 04½-05 | -04¾ |
| Grade C, Bunker oil..... | 1.60 | -1.60 |
| Cargoes..... | 1.50 | nominal |

*Transparent through neck of a 4 oz. bottle.

**MEXICAN CRUDE AND BUNKER OILS**
F. O. B. Steamer Tampico

| | | |
|---|---|---|
| Heavy, Taxes to be added..... | 1.15 | -1.15 |
| Grade C, Bunker oil Taxes paid..... | 1.45 | 1.45 |
| Grade C. Bunker oil F. A. S. New Orleans..... | 1.60 | 1.60 |

**Lubricating Oils**
**SOUTH TEXAS**
(Viscosity at 100°F; cold test 0)
(Tanker, F. O. B. Houston)

| | Mar. 1 | Feb. 22 |
|---|---|---|
| 100 Vis. No. 2 Unfiltered Pale.... | 07 | 07 |
| 150 Vis. No. 2½ Unfiltered Pale.. | 09 | 09 |
| 200 Vis. No. 3 Unfiltered Pale.... | 11 | 11 |
| 300 Vis. No. 3 Unfiltered Pale.... | 13½ | 13½ |
| 500 Vis. No. 3½ Unfiltered Pale.. | 15 | 15 |
| 200 Vis. No. 5½ Red Oil..... | 11 | 10½ |
| 300 Vis. No. 5½ Red Oil..... | 13 | 12 |
| 500 Vis. No. 6 Red Oil..... | 13¾ | 13¾ |
| 800 Vis. No. 6 Red Oil..... | 17 | 18½ |

# Pacific Export Market

Cargo lots quotations at seaboard, Los Angeles)

| | Mar. 1 | Feb. 22 |
|---|---|---|
| Gasoline, U. S. Motor— 54°—56°..... | 8 -10 | 8 -10 |
| Gasoline—U. S. Motor blends and special cuts... | 9 -10½ | 9 -10½ |
| Gas Oil, 24°—30°B. per bbl..... | $1.15 | $1.15 |
| Diesel Oil, 27°B—plus per bbl..... | $1.15 | $1.15 |
| Bunker Oil, 14°—18°B. per bbl..... | $1.00 | $1.00 |
| Fuel Oil, 14°—18°B. per bbl..... | $1.00 | $1.00 |
| Kerosene, W. W. 40°—42° B per gal., 125-150 flash test..... | 05 -05½ | 05 -05½ |
| **Cased Goods** | | |
| Gasoline, U. S. Motor..... | $2.35 | $2.35 |
| Kerosene, W. W. 40°—42° B per case, flash test 125-150..... | $1.40-1.50 | $1.40-1.50 |

# N. Y. Domestic Market

The following light oil, gas and fuel oil prices are F. O. B. New York refineries, being products made from Domestic (including California) and Mexican Crudes.

| | Mar. 1 | Feb. 22 |
|---|---|---|
| U. S. Motor Gasoline, Tank Cars Delivered greater N.Y. | -13½ | -13½ |
| U. S. Motor Gasoline, Tank Cars Bayonne..... | -12½ | -12½ |
| Kerosene, 41-43 150 W. W. Tank Cars Del'd greater N.Y. | -11 | -.10½ |
| Grade C Bunker f.o.b. N.Y. Ref. | 1.75 | 1.75 |
| Diesel Oil f.o.b. Refinery..... | 2.30 | 2.20 |
| Gas Oil, 36-40, Bulk Refinery.. | -06 | -06¼ |
| Gas Oil, 28-34 Bulk, Refinery | -05½ | -05½ |

## Southern Pipe Line Plans To Reduce Capital

OIL CITY, PA., March 1.—Directors of the Southern Pipe Line Co. have called a special meeting of stockholders for May 5 at Oil City to vote on a proposal to reduce the capital stock from $10,000,000 to $5,000,000. It is the plan of the directors to change the par value of the stock from $100 to $50 a share and issue new stock share for share of the old.

Stockholders, if the plan is adopted, will receive $40 cash per share, a sum amounting to $4,000,000, but the company will continue to hold $1,000,000 balance of the par value of the stock for the present. Concerning this holding President Forrest M. Towl wrote stockholders:

"It is considered essential to the safe and proper conduct of the company's future business that the remainder of the capital assets should, for the present, be retained by the company."

This sum may be returned to the stockholders at a later date.

Shares transferred after March 5 will not be entitled to vote on the proposed reduction in capital stock.

## Fourth Saginaw Test Is a Producer

SAGINAW, MICH., March 1.—The fourth well drilled by the Saginaw Prospecting Co., just outside the city of Saginaw, was shot on Thursday and appears to be as good as any heretofore drilled. All of the four are producers and the latest one proves additional territory. It also gave encouragement in that it found the top of the Berea sandstone, the oil bearing formation, higher structurally than did the other three wells.

The three earlier wells are pumping a total of about 50 barrels daily of which about half is coming from the No. 2 well.

The company will soon start drilling No. 5, near the new well.

### California Market Improving

LOS ANGELES, March 1.—The general tone of the California oil market is improved. The big marketers are only meeting contract obligations in supplying crude which is a favorable indication that crude prices may advance before many weeks. The decline of crude production continues. There has been a slacking up in the shipments of California gasoline to the East Coast. Only one cargo of about 75,000 barrels was shipped in the first half of February.

OTTAWA, KANS.—John L. Rich, consulting geologist of Ottawa, Kans., is conducting experiments on a process for the recovery of oil by a combination of mining and restored pressure methods.

# Crude Oil Prices All Fields

**ALL PRICES EFFECTIVE. *March 1***

### EASTERN FIELDS
**Posted by Joseph Seep Purchasing Agency**

| | |
|---|---|
| Penna. Grade Oil in New York Transit Lines (Alleghany, N. Y. District) | $3.90 |
| Bradford District Oil in National Transit Lines (Bradford District) | 3.90 |
| Penna. Grade Oil in National Transit Lines (Other Pennsylvania) | 3.80 |
| Penna. Grade Oil in Southwest Penna. Pipe Lines (Other Pennsylvania) | 3.80 |
| Penna. Grade Oil in Eureka Pipe Lines (West Virginia) | 3.75 |
| Penna. Grade Oil in Buckeye Pipe Lines (Macksburg, O. district) | 3.65 |
| Keister Grade in National Transit Lines (Butler Co.) | $2.45 |
| Gaines, Tioga Co. (Pa.) | 2.95 |
| Cabell Grade in Eureka Pipe Lines (West Virginia) | 2.20 |
| Corning Grade in Buckeye Pipe Lines (Ohio) | 2.35 |
| *Somerset Medium in Cumberland Pipe Lines (Kentucky) | 2.30 |
| *Somerset Light in Cumberland Pipe Lines (Kentucky) | 2.45 |
| Ragland Grade in Cumberland Pipe Lines (Kentucky) | 1.15 |

*Somerset oil run prior to Oct. 1, 1923, takes price of 6 cents lower than above quotations.

### CENTRAL STATES FIELDS
**Posted by Ohio Oil Co.**

| | | | | | |
|---|---|---|---|---|---|
| Wooster | $2.25 | Indiana | $2.00 | Plymouth | $1.65 |
| Lima | 2.25 | Princeton | 2.12 | *Canadian Petrolia | 2.68 |
| Waterloo | 1.10 | Illinois | 2.12 | *Posted by Imperial Oil, Ltd. | |

### OKLAHOMA, KANSAS And NORTH TEXAS FIELDS
**(Prices of Prairie Oil & Gas Co.)**
**(Prairie's prices apply in Oklahoma, Kansas, North and Central Texas.)**

| | | | |
|---|---|---|---|
| 28-28.9 | $1.40 | 41-41.9 | $2.44 |
| 29-29.9 | 1.48 | 42-42.9 | 2.52 |
| 30-30.9 | 1.56 | 43-43.9 | 2.60 |
| 31-31.9 | 1.64 | 44-44.9 | 2.68 |
| 32-32.9 | 1.72 | 45-45.9 | 2.76 |
| 33-33.9 | 1.80 | 46-46.9 | 2.84 |
| 34-34.9 | 1.88 | 47-47.9 | 2.92 |
| 35-35.9 | 1.96 | 48-48.9 | 3.00 |
| 36-36.9 | 2.04 | 49-49.9 | 3.08 |
| 37-37.9 | 2.12 | 50-50.9 | 3.16 |
| 38-38.9 | 2.20 | 51-51.9 | 3.24 |
| 39-39.9 | 2.28 | 52 and above | 3.32 |
| 40-40.9 | 2.36 | | |

**Humble Oil & Refining Co Prices**

(Ranger, North Texas, Mexia, Powell, Richland, Wortham, Lytton Springs, Currie and Moran crudes all in Texas.)

Effective Feb. 1, Humble posted same gravity and price schedule as that posted by Prairie, excepting that Humble is paying 8c less for each full degree below 28 gravity.

**Magnolia Petroleum Co. Prices**
**In Oklahoma, Kansas and North Texas**

Effective Feb. 1, Magnolia posted same gravity and price schedule as Prairie in all fields where it purchases on a gravity basis, excepting that it is paying $1.20 for all oil below 28 gravity.

Effective Feb. 1, Corsicana heavy was advanced to $1.15 per barrel.

### NORTH LOUISIANA—ARKANSAS FIELDS
***Prices of the Standard Oil Co. of Louisiana**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Caddo, below 32 | $1.85 | Haynesville, below 33 | $1.75 | Smackover, 24-24.9 | $1.25 |
| do 32-34.9 | 2.00 | do 33 and above | 1.85 | do 25-25.9 | 1.30 |
| do 35-37.9 | 2.10 | El Dorado, below 33 | 1.75 | do 26-26.9 | 1.35 |
| do 38 and above | 2.20 | do 33 and above | 1.85 | do 27 and above | 1.40 |
| Homer, below 31 | 1.60 | Bull Bayou, 32-34.9 | 1.70 | De Soto | 2.05 |
| do 31-32.9 | 1.75 | do 35-37.9 | 1.85 | Crichton | 1.85 |
| do 33-34.9 | 1.85 | do 38 and above | 2.00 | Bellevue | 1.65 |
| do 35 and above | 1.95 | Smackover, below 24 | 1.00 | Cotton Valley | 1.10 |

*Same prices maintained by The Texas Co., Gulf Refining Co. of Louisiana and Louisiana Oil Refining Corp. All purchasers of Smackover have maintained since Feb. 1 and 2, the same gravity and price schedule as Standard. Gulf is paying 95c for Calion (East El Dorado Crude.) Louisiana Oil Refg. Corp. is paying $1.40 for Urania, La. crude, effective March.

### STEPHENS, ARKANSAS
**Posted by Louisiana Oil Refining Corp., and Atlantic Oil Producing Co.**

| | | | |
|---|---|---|---|
| 26 and above | $1.50 | Below 26 | $1.30 |

### GULF COASTAL FIELDS
**(Posted by Humble Oil & Refining Co., The Texas Co., Gulf Production Co., Sun Oil Co. and Sinclair Crude Oil Purchasing Co.)**

| | | | |
|---|---|---|---|
| Grades A | $1.50 | Grades B | $1.25 |

Goose Creek, Hull, Orange and Pierce Junction are the only Gulf Coastal fields that have A and B grade classifications. All other fields are classified as A grades only.

### ROCKY MOUNTAIN FIELDS
**Prices of Ohio Oil Co. and Midwest Refining Co.**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| †Salt Creek | 29-29.9 | $1.48 | | 36-36.9 | $2.04 | Rock Creek | $2.00 |
| | 30-30.9 | 1.56 | | 37 and above | 2.12 | †Osage | 2.15 |
| | 31-31.9 | 1.64 | Elk Basin | | 2.15 | †Cat Creek, Mont. | 2.15 |
| | 32-32.9 | 1.72 | Grass Creek light | | 2.15 | Sunburst, Mont. | 1.15 |
| | 33-33.9 | 1.80 | Big Muddy | | 2.00 | †Hogback, N. Mex. | 2.20 |
| | 34-34.9 | 1.88 | Lance Creek | | 2.15 | Artesia, N. Mex. | 1.70 |
| | 35-35.9 | 1.96 | | | | | |

†Posted by Midwest Refining Co. Midwest also buys Grass Creek light, and Elk Basin. The Texas Co. buys Salt Creek crude.

### CALIFORNIA
**Prices of Standard Oil Co. of California**

Standard Oil Co. of California on Sept. 22 reduced California crude from 10 to 35 cents per barrel and posted 19 new price classifications in the various fields. Instead of paying the same price for the same gravity of oil in all fields regardless of the value of the oil as it previously has done, the Standard put into effect a new schedule which provides a different schedule of prices for each field and takes into account the varying values of oils of the same gravity in the different fields.

On Oct. 27, it further reduced heavy oils in amounts ranging up to 15 cents. New base price for heavy oils in the San Joaquin Valley is 75 cents, in Southern California fields, 85 cents, and in the Rosecrans-Dominguez, Santa Maria and Ventura county fields, it is $1 per barrel for 14 to 14.9 gravity. Light oils remain unchanged.

The complete schedule of prices in California can be obtained from the editorial department of National Petroleum News on application.

# REFINERS' and COMPOUNDERS' SUPPLIES

Following are the average market prices for the week on materials used by refiners and compounders f. o. b. shipping point as effective this date.

**Refiners' Supplies**

| | Mar. 1 | Feb. 22 |
|---|---|---|
| Soda Ash light 58% bags cwt. | $1.38 | $1.38 |
| Silicate of Soda 60 deg. drums cwt. | 1 65 | 1.70 |
| Sal Soda wks cwt. | 1.10@1.25 | 1.10@1.25 |
| Caustic Soda 70% solid. cwt. | 3.10 | 3.10 |
| Chloride of Lime cwt. works | 2.00 | 2.00 |
| Sulphuric Acid 60 deg. tank cars f. o. b. shipping point per ton | 10.00 | 10.00 |
| Liquid Chlorine tank cars works lb. | .04 | .04 |

**Compounders' Supplies (Open Market)**

| | | | |
|---|---|---|---|
| **Vegetable Oils—** | | | |
| Linseed carloads spot lb. | | 11 2 | 11 3 |
| February | | 11.2 | 11 3 |
| Tanks, spot | | 10 4 | 10 5 |
| Boiled carloads spot lb. | | 11 3 | 11 4 |
| *Soya Bean spot, Bbls. lb. | | 13½ | 13½ |
| **Animal Oils—** | | | |
| English Degras lb. | .05½ | | .05¾ |
| Domestic Degras, bbls., carloads lb. | .04¼ | | .04¾ |
| *Horse lb. | .10 | | .10 |
| **Oleic Acid—** | | | |
| Dist. Bbls lb. | .10¾@.11¼ | .10¾@.11¼ | |
| Saponified Bbls lb. | .11¼@.11¾ | .11¼@.11¾ | |
| **Castor Oil—** | | | |
| No. 1 Carlots, Bbls. | .13½ | | .14 |
| No. 3 Carlots, Bbls. | .13 | | .13½ |
| **Lard Oils—** | | | |
| Prime | | | |
| Winter Strained. | to 1½ffa. | 40@45c.t.lb | .17½ .17½ |
| Extra | | | |
| Winter Strained. | 2 to 4½ffa. | 40/45c.t.lb. | .14¾ .15 |
| Extra | 4 to 5 ffa. | 40/45c.t.lb. | .14½ .14½ |
| Extra No. 1 | 7 to 10 ffa. | 40/50c.t.lb. | .13½ .13¾ |
| No. 1 | 15 to 18 ffa. | 40/45c.t.lb. | 13 .13¼ |
| No. 2 | 22 to 25 ffa. | 40/45c.t.lb. | .12¾ .13 |
| Prime Edible Tallow under 1¼ffa. 40/45c.t.N.Y. lb. | | .10¼ | .10¼ |
| Tallow acidless lb. | | .12¾ | .12¾ |
| Lard Stearine lb. | | .17½ | .17¾ |
| Oleo Stearine lb. | | .11¼ | .11½ |
| **Neatsfoot Oil—** | | | |
| Pure bbls.-lb. | | .17¾ | .17¾ |
| Extra do lb. | | .13½ | .13¾ |
| No. 1 bbls.-lb | | .13 | .13¼ |
| Cold pressed lb. | | .22¾ | .22¾ |
| **Fish Oils—** | | | |
| Menhaden Oil | | | |
| Light pressed gal. | | .70 | .70 |
| White gal. | | .73 | .73 |
| Yellow bleached gal. | | .75 | .75 |
| *Herring tank cars coast gal. | | .50 | .50 |
| Whale, extra winter bleached gal. | | .82 | .82 |
| Seal gal | | | Nominal |
| **Naval Stores—** | | | |
| Turpentine, N. Y. gal. | | .95 | .96½ |
| Turpentine† gal. | | .89 | .90 |
| Rosin, B. N. Y. Bbl. | | 12.25 | 13.40 |
| Rosin, F. N. Y. Bbl. | | 14.00 | 14.50 |
| Rosin, B† Bbl. | | 10.50 | 11.90 |
| Rosin, F† Bbl | | 12.50 | 13.00 |
| Rosin Oil 1st run gal. | | .68½ | .68½ |
| Rosin Oil 2nd run gal. | | .73½ | .73½ |
| **Pine Tar—** | | | |
| Kiln Burnt Bbl. | | 15 00 | 15 00 |
| Retort Bbl. | | 16.00 | 16.00 |
| **Alcohol—Denatured Formula 5** | | | |
| Bbls gal. | | .34 | .34 |
| Drums gal. | | .33 | .33 |

†Savannah, Ga. market
*Nominal.

## Caustic Soda Is Weaker Sulfuric Acid Firm

By Special Correspondent

NEW YORK, March 1.—Following is a review of the markets for oils and supplies used in compounding and refining:

**ALCOHOL** easy and dull. Big buyers purchasing hand-to-mouth. The fact that winter is nearly over, discourages buying by anti freezing mixture makers. Prices tending lower. Spot stocks heavy.

**ANIMAL OILS** shade weaker. Prime lard oil dull. Other grades slightly lower. Pure neatsfoot oil steady but other grades showed slight declines. Tallow oil flat. Oleic acid dull. Unchanged. More interest in oleo stearine at 11½ cents. Domestic degras dull 4½ to 5 cents.

**FISH OILS** practically unchanged. Crude menhaden still 52½ to 55 cents gallon in tanks at factory. Light pressed 70 cents a gallon in barrels, New York. Domestic cod oil steady at 63 to 64 cents a gallon in barrels, New York. Demand lagging. Sperm oil dull. Whale oil quiet. More interest in herring oil.

**SAL SODA** dull. Business strictly hand-to-mouth. Stocks moderate. Prices are slightly easier.

**SODA ASH** quiet but steady. Business confined immediate requirements. No price changes.

**CAUSTIC SODA** dull and tending lower. Domestic and export buyers purchasing hand to mouth. Jobbers holding off.

**BLEACHING POWDER** steady as demand improves. Prices unchanged. Stocks fair. Production normal.

**SULFURIC ACID** firm but quiet. More interest in future shipments. Stocks moderate.

**LIQUID CHLORINE** firm. Offerings lighter at 4 cents a pound in tanks, factory. Spot stocks lighter.

**NAVAL STORES** tendency downwards. Price fluctuations narrow. Demand for both rosin and turpentine lighter and stocks are in excess of demand. Foreign demand lagging although inquiries are numerous. Rosin oils marking time and prices are weak. Tar and pitch dull.

NEW BRIGHTON, PA.—H. & H. service station has remodeled its station. Sinclair Refining Co.'s products are handled.

## Benzol Trade Increases

NEW YORK, March 1—Trade in motor benzol picked up a little last week and prices were steady at 23 to 24 cents a gallon in tank cars at the ovens with little available at the inside figure. Most marketers are asking 24 cents. Demand from jobbers and manufacturers of motor fuel mixtures has improved considerably of late.

Production of motor benzol is falling, reflecting the decline in coke production. Offerings for future shipment are light. Export demand is better but domestic trade is still receiving the preference. Stocks of benzol available for immediate delivery are small. No price changes are expected for some time.

## Week's Bulk Shipments From Los Angeles

LOS ANGELES, Feb. 28.—Bulk petroleum shipments from Los Angeles harbor for the week ending Feb. 27 totaled 1,750,145 barrels, being slightly under the mark of 2,196,941 touched the pervious week. Twenty tankers were loaded out. Shipments by products were as follows:

Fuel oil, 743,198 barrels; crude, 653,932 barrels; gas oil, 76,000 barrels; gasoline, 211,182 barrels; kerosene, 66,108 barrels.

The following table shows the division of shipments by products:

Atlantic coast shipments were as follows:

Atlantic Gulf & West Indies Steamship Co., 93,000 barrels of crude to Bayonne; Tide Water Oil Co., 68,960 barrels of fuel to Bayonne; Standard Oil Co. of New Jersey, 116,425 barrels of crude to Bavonne; Pan American Petroleum & Transport Co., 76,145 barrels of gasoline to Bayonne; Sun Oil Co., 76,000 barrels of gas oil to Philadelphia.

**Shipments by Products and Destinations**

| | Barrels | | | | |
|---|---|---|---|---|---|
| | Crude | Kerosene | Fuel | Gasoline | Gas Oil |
| Atlantic Domestic | 209,425 | ..... | 68,960 | 76,146 | 76,000 |
| Atlantic Foreign | ..... | ..... | 207,533 | ..... | ..... |
| Pacific Domestic | 360,344 | ..... | 256,788 | 135,036 | ..... |
| Pacific Foreign | 84,163 | 66,108 | 209,917 | ..... | ..... |

| | |
|---|---|
| Atlantic Domestic total all products | 430,541 bbls. |
| Atlantic Foreign, total all products | 207,533 bbls. |
| Pacific Domestic, total all products | 360,344 bbls. |
| Pacific Foreign, total all products | 359,913 bbls. |

# Northern Pipe Line Group Nets More in 1925

CLEVELAND, March 1. — The northern group of eastern pipe lines, those of which D. S. Bushnell is president, fared better last year than in 1924 and several of them better than any time since 1922.

The best showing was made by the Indiana Pipe Line Co. which increased its net income by more than 50 per cent over the 1924 net. This company averaged $19.19 per $50 share as compared with $5 99 a share in 1924, $9.65 in 1923; $15.33 in 1922, and $11.63 in 1921.

Earnings of the Buckeye Pipe Line Co. averaged $5.23 per $50 share. In 1924 this company netted $4.49 per share; in 1923 $5.21; in 1922 $8.72 and in 1921, $8.38.

Net earnings of the Northern Pipe Line Co. averaged $7.77 per $100 share. In 1924 the net earnings averaged $5.35; in 1923, $7.70; in 1922, $12.05, and in 1921, $11.32.

The improvement in Northern's earnings indicates a better movement of western crude oil to eastern refineries as this company's lines form a connecting link between the lines of the Buckeye and those of the New York Transit Co. and National Transit Co. It has no gathering lines.

The New York Transit Co. netted an average of $4.87 per $100 share in 1925 as compared with $3.72 in 1924; $4.77 in 1923; $10.98 in 1922, and $16.41 in 1921.

### S. O. California to Retire Notes

CLEVELAND, March 1.—Standard Oil Co. of California has announced that as soon as the merger with the Pacific Oil Co. is completed that it will call for redemption all of the $20,000,000 outstanding 5 per cent serial gold notes. This will leave the company without funded debt.

Notes will be retired as follows: Series maturing Aug. 1, 1927 at premium of ½%; series maturing Aug. 1, 1928 at premium of 1%; series maturing Aug. 1, 1929 at premium of 1½%; series maturing Aug. 1, 1930 at premium of 2%; series maturing Aug. 1, 1931 at premium of 2½%; series maturing Aug. 1, 1932 at premium of 3% and series maturing Aug. 1, 1933 at premium of 3½%.

## Cleveland Stock Market

| | Par | Feb. 27 Bid | Asked | Last Sale |
|---|---|---|---|---|
| Canfield Oil Co. | $100 | ..... | 109 | 108 |
| do pfd. | 100 | ..... | 105 | 100 |
| Fred G Clark Co. | 10 | 2¾ | 4 | 4 |
| National Refin. Co. | 25 | 37½ | 42 | 41 |
| do pfd. | 100 | ..... | 135 | 129½ |
| Paragon Refin. Co. | 25 | 8 | 8¾ | 8¼ |
| do pfd. | 100 | 65 | 68 | 67 |

x-Exdividend

### Indiana Pipe Line Co. Income Accounts

| | 1925 | 1924 | 1923 | 1922 | 1921 |
|---|---|---|---|---|---|
| Net income | $ 919,801 | $ 599,433 | $ 965,944 | $ 1,532,855 | $ 1,163,550 |
| Dividend | 400,000 | 600,000 | 800,000 | 3,000,000 | 800,000 |
| Surplus | $ 519,801 | *$ 567 | $ 165,944 | *$ 1,467,145 | $ 363,550 |

*Deficit.

### Indiana Pipe Line Co. Balance Sheets as of Dec. 31

| | 1925 | 1924 | 1923 | 1922 | 1921 |
|---|---|---|---|---|---|
| **ASSETS** | | | | | |
| Plant | $ 5,103,530 | $ 5,126,038 | $ 5,097,255 | $ 5,088,422 | $ 5,381,373 |
| Materials, supplies | 52,978 | 66,648 | 110,592 | 125,737 | 131,547 |
| Current assets | 5,465,380 | 4,941,566 | 4,982,730 | 4,867,295 | 6,253,401 |
| Total | $10,621,888 | $10,134,252 | $10,190,577 | $10,081,454 | $11,766,321 |
| **LIABILITIES** | | | | | |
| Capital stock ($50) | $ 5,000,000 | $ 5,000,000 | $ 5,000,000 | $ 5,000,000 | $ 5,000,000 |
| Accounts payable | 865,196 | 899,187 | 1,040,710 | 1,159,690 | 1,108,299 |
| Depreciation reserve | 2,415,659 | 2,368,833 | 2,278,068 | 2,165,910 | 2,275,023 |
| Surplus | 2,341,034 | 1,871,232 | 1,871,799 | 1,755,854 | 3,382,999 |
| Total | $10,621,888 | $10,134,252 | $10,190,577 | $10,081,454 | $11,766,321 |

### Buckeye Pipe Line Co. Income Accounts

| | 1925 | 1924 | 1923 | 1922 | 1921 |
|---|---|---|---|---|---|
| Net income | $ 1,047,686 | $ 938,000 | $ 1,041,571 | $ 1,744,396 | $ 1,676,434 |
| Dividends | 800,000 | 800,000 | 1,350,000 | 7,000,000 | 1,600,000 |
| Surplus | $ 247,686 | $ 138,000 | *$ 308,429 | *$ 5,255,604 | $ 76,434 |

*Deficit

### Buckeye Pipe Line Co. Balance Sheets as of Dec. 31

| | 1925 | 1924 | 1923 | 1922 | 1921 |
|---|---|---|---|---|---|
| **ASSETS** | | | | | |
| Plant | $19,224,006 | $18,949,065 | $18,380,665 | $18,021,847 | $17,771,112 |
| Materials, supplies | 212,108 | 271,377 | 388,388 | 371,081 | 371,179 |
| Current assets | 4,773,906 | 4,249,328 | 5,536,040 | 5,157,208 | 9,699,939 |
| Total | $24,210,021 | $23,469,770 | $23,305,093 | $23,550,136 | $27,842,230 |
| **LIABILITIES** | | | | | |
| Capital stock ($50) | $10,000,000 | $10,000,000 | $10,000,000 | $10,000,000 | $10,000,000 |
| Accounts payable | 1,812,425 | 1,801,251 | ‡ 1,954,522 | 2,127,337 | 1,208,673 |
| Depreciation reserve | 8,446,044 | 7,864,653 | 7,534,705 | 7,198,504 | 6,803,659 |
| Surplus | 3,951,552 | 3,803,866 | 3,815,866 | 4,224,295 | 9,829,898 |
| Total | $24,210,021 | $23,469,770 | $23,305,093 | $23,550,136 | $27,842,230 |

### Northern Pipe Line Co. Income Accounts

| | 1925 | 1924 | 1923 | 1922 | 1921 |
|---|---|---|---|---|---|
| Net income | $ 310,748 | $ 214,205 | $ 308,155 | $ 482,167 | $ 453,050 |
| Dividends | 240,000 | 240,000 | 400,000 | 1,000,000 | 400,000 |
| Surplus | $ 70,748 | $ 25,795 | *$ 91,845 | *$ 517,833 | $ 53,050 |

*Deficit.

### Northern Pipe Line Co. Balance Sheets as of Dec. 31

| | 1925 | 1924 | 1923 | 1922 | 1921 |
|---|---|---|---|---|---|
| **ASSETS** | | | | | |
| Plant | $ 3,015,664 | $ 2,984,396 | $ 2,979,717 | $ 2,969,937 | $ 2,941,216 |
| Material, supplies | 28,972 | 39,086 | 41,478 | 44,313 | 51,680 |
| Current assets | 3,351,706 | 3,212,187 | 3,282,148 | 4,065,804 | 3,904,843 |
| Total | $ 6,396,343 | $ 6,235,669 | $ 6,303,343 | $ 7,080,054 | $ 6,897,739 |
| **LIABILITIES** | | | | | |
| Capital stock ($100) | $ 4,000,000 | $ 4,000,000 | $ 4,000,000 | $ 4,000,000 | $ 4,000,000 |
| Accounts payable‡ | 488,067 | 458,455 | 556,910 | 1,325,886 | 620,249 |
| Depreciation reserve | 1,653,410 | 1,568,096 | 1,511,520 | 1,427,410 | 1,352,898 |
| Surplus | 254,866 | 209,118 | 234,913 | 326,758 | 924,592 |
| Total | $ 6,396,343 | $ 6,235,669 | $ 6,303,343 | $ 7,080,054 | $ 6,897,739 |

### New York Transit Co. Income Accounts

| | 1925 | 1924 | 1923 | 1922 | 1921 |
|---|---|---|---|---|---|
| Net income | $ 243,792 | $ 186,418 | $ 238,732 | $ 549,194 | $ 820,957 |
| Dividends | 150,000 | 100,000 | 375,000 | 4,750,000 | 800,000 |
| Surplus | $ 93,792 | $ 86,418 | *$ 136,268 | *$ 4,200,806 | $ 20,957 |

*Deficit

### New York Transit Co. Balance Sheets as of Dec. 31

| | 1925 | 1924 | 1923 | 1922 | 1921 |
|---|---|---|---|---|---|
| **ASSETS** | | | | | |
| Plant | $ 6,972,229 | $ 6,942,560 | $ 6,966,548 | $ 6,948,076 | $ 6,754,147 |
| Material, supplies | 72,772 | 103,333 | 141,377 | 128,883 | 172,439 |
| Current assets | 2,486,920 | 2,381,017 | 2,317,692 | 3,167,588 | 6,651,361 |
| Total | $ 9,531,921 | $ 9,426,910 | $ 9,425,617 | $10,244,547 | $13,577,947 |
| **LIABILITIES** | | | | | |
| Capital stock ($100) | $ 5,000,000 | $ 5,000,000 | $ 5,000,000 | $ 5,000,000 | $ 5,000,000 |
| Accounts payable‡ | 838,818 | 903,609 | 1,007,156 | 1,795,902 | 1,085,793 |
| Depreciation reserve | 2,343,096 | 2,217,087 | 2,098,665 | 1,942,582 | 1,785,285 |
| Surplus | 1,350,007 | 1,306,214 | 1,319,796 | 1,506,063 | 5,706,869 |
| Total | $ 9,531,921 | $ 9,426,910 | $ 9,425,617 | $10,244,547 | $13,577,947 |

‡Includes reserves for taxes, fire insurance, annuities and benefits.

# Transactions In Oil Shares on New York Stock Exchange

| 1925 High | 1925 Low | 1926 High | 1926 Low | | Listed Capital | Par Value | Stocks | Div. Rate | Last Paid | Transactions week ended Feb. 27 Sales | First | High | Low | Last | Ch'ge |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 79¾ | 48 | 74 | 69 | (sh) | 200,000 | N.P. | American Republics | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 47½ | 32 | 59⅛ | 44¾ | $ | 56,000,000 | $25 | Associated Oil | 50cQ | Jan. 25, 26 | 17,000 | 58⅞ | 58⅞ | 58¼ | 58⅛ | — ⅜ |
| 117½ | 95½ | 110 | 102 | | 50,000,000 | 100 | Atlantic Refining | ..... | June 16, 24 | 9,000 | 106 | 106 | 102 | 103 | —3 |
| 117¾ | 113½ | 117 | 116½ | | 20,000,000 | 100 | do pfd | $1¾Q | Feb. 1, 25 | 100 | 116½ | 116½ | 116½ | 116½ | 0 |
| 33½ | 18¾ | 33½ | 26½ | | 18,428,350 | 25 | Barnsdall Corp. A | 50cQ | Jan. 2, 26 | 16,400 | 29½ | 29¾ | 26½ | 26⅝ | —3⅛ |
| 30 | 16 | 29½ | 25¾ | | 3,713,275 | 25 | do B | 50cQ | Jan. 2, 26 | 1,200 | 26½ | 27 | 25¾ | 26 | — ½ |
| 34⅜ | 23⅞ | 38⅛ | 30⅛ | $ | 44,923,000 | $25 | California Petroleum | 50cQ | Mar. 1, 26 | 31,400 | 35⅛ | 35⅛ | 32½ | 32⅞ | —2⅛ |
| 70 | 42½ | 73 | 54¾ | | 19,834,300 | 100 | General Asphalt | ..... | ..... | 23,600 | 62½ | 62½ | 54¾ | 55¾ | —8⅛ |
| 109 | 86½ | 113¾ | 98 | | 7,416,000 | 100 | do pfd | $1¼Q | Mar. 1, 26 | 1,700 | 102½ | 102½ | 98 | 98 | —6¾ |
| 59⅜ | 42 | 59½ | 52¾ | | 29,223,650 | 25 | General Petroleum | 75cQ | Dec. 15, 25 | 25,100 | 55¾ | 55¾ | 52¾ | 52⅞ | —3 |
| 85 | 59 | 72 | 64 | | 25,000,000 | 100 | Houston Oil | ..... | ..... | 2,400 | 65½ | 66¾ | 64 | 64 | —1⅜ |
| 41¾ | 13½ | 34 | 24½ | (sh) | 500,000 | N.P. | Independent Oil & Gas | 25cQ | Jan. 11, 26 | 14,800 | 28½ | 30¼ | 27⅛ | 28 | — ¼ |
| 14¾ | 5½ | 13¾ | 9½ | $ | 3,204,590 | $10 | Indian Refining | ..... | Dec. 15, 20 | 3,300 | 12¼ | 12¼ | 10¾ | 10⅞ | —1⅛ |
| 12⅝ | 6 | 12½ | 9½ | | 4,545,860 | 10 | do ctfs | ..... | ..... | 200 | 11½ | 11⅝ | 10½ | 10½ | —1 |
| 110 | 77 | 104 | 104 | | 2,296,400 | 100 | do pfd | ..... | Dec. 15, 21 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1½ | ⅜ | ¾ | ½ | | 1,678,760 | 10 | Kansas & Gulf | ..... | ..... | 500 | ½ | ½ | ½ | ½ | 0 |
| 23¾ | 13¾ | 19¾ | 16 | (sh) | 1,121,530 | N.P. | Louisiana Oil | ..... | ..... | 10,100 | 16¾ | 16⅞ | 16 | 16⅛ | — ⅜ |
| 35½ | 20⅜ | 28⅜ | 24 | (sh) | 330,000 | N.P. | Maracaibo Oil | ..... | ..... | 4,200 | 24¾ | 24¾ | 24 | 24 | — ¾ |
| 60½ | 32⅝ | 60¾ | 55 | (sh) | 1,894,518 | N.P. | Marland Oil Co | $1Q | Dec. 31, 25 | 49,100 | 58¾ | 58⅜ | 56 | 56½ | —2 |
| 250 | 225 | ..... | ..... | $ | 45,942,800 | $100 | Mexican Petroleum | $3Q | Jan. 20, 26 | ..... | ..... | ..... | ..... | ..... | ..... |
| ..... | ..... | ..... | ..... | | 12,000,000 | 100 | do pfd | $2Q | Jan. 20, 26 | ..... | ..... | ..... | ..... | ..... | ..... |
| 22½ | 29 | 12¾ | 6 | (sh) | 945,939 | N.P. | Mexican Seaboard | ..... | Nov. 15, 24 | 12,200 | 9¼ | 9¼ | 6 | 8 | —1¾ |
| 38 | 25¾ | 37 | 32½ | (sh) | 1,357,800 | N.P. | Mid-Continent Petroleum | ..... | Aug. 1, 25 | 14,900 | 34⅜ | 34½ | 32½ | 32½ | —1⅜ |
| 94¾ | 83 | 97 | 94 | $ | 6,718,000 | $100 | do pfd | $1¾Q | Mar. 1, 26 | 200 | 97 | 97⅛ | 96⅜ | 97⅜ | + ⅜ |
| 3¾ | ⅝ | 2½ | 1½ | | 26,013,760 | 10 | Middle States | ..... | July 1, 25 | 4,500 | 1¾ | 1¾ | 1½ | 1½ | — ⅜ |
| 1½ | 1½ | 1⅝ | ⅜ | | 3,786,480 | .... | do ctfs | ..... | ..... | 200 | ⅜ | ⅜ | ⅜ | ⅜ | — ⅜ |
| 78½ | 51⅜ | 83¼ | 74¼ | (sh) | 3,500,000 | N.P. | Pacific Oil | $1.50S.A. | Jan. 20, 26 | 41,100 | 82¾ | 82½ | 79½ | 80⅜ | —1¾ |
| 85⅜ | 59½ | 76½ | 61½ | $ | 48,307,400 | $50 | Pan American P. & T | $1.50Q | Jan. 20, 26 | 12,300 | 65¾ | 66¾ | 61½ | 64 | —1¼ |
| 84½ | 60⅜ | 78⅛ | 62½ | | 90,484,800 | 50 | do B | $1.50Q | Jan. 20, 26 | 128,400 | 66¾ | 67⅛ | 62½ | 63⅛ | —1⅜ |
| 49¾ | 37⅜ | 46 | 40 | (sh) | 400,000 | N.P. | Pan American Western B | 50cQ | Jan 30, 26 | 10,000 | 41 | 41¾ | 40 | 40 | —1 |
| 6¾ | 2¼ | 11¾ | 4½ | (sh) | 198,770 | N.P. | Panhandle P. & R | ..... | ..... | 12,300 | 11¾ | 11¾ | 8 | 9 | —1⅝ |
| 60½ | 37 | 85 | 51 | $ | 2,935,200 | $100 | do pfd | ..... | July 2, 23 | 800 | 83 | 83 | 74 | 74 | —11 |
| 47⅜ | 36¼ | 48⅝ | 42¾ | (sh) | 2,045,381 | N.P. | Phillips Petroleum | 75cQ | Jan. 2, 26 | 50,400 | 47¼ | 47¾ | 44½ | 45 | —2 |
| 3½ | 1¾ | 1⅞ | 1⅜ | $ | 29,622,925 | $25 | Pierce Oil Corp | ..... | ..... | 2,600 | 1⅜ | 1⅜ | 1½ | 1⅜ | — ¼ |
| 40 | 20¾ | 27⅜ | 24 | | 15,000,000 | 100 | do pfd | ..... | Feb. 1, 22 | 200 | 26 | 26 | 25 | 25 | 0 |
| 8¼ | 4½ | 7 | 5 | (sh) | 2,500,000 | N.P. | Pierce Petroleum | ..... | ..... | 5,100 | 5¼ | 5⅜ | 5 | 5 | — ⅜ |
| 32⅝ | 12½ | 17½ | 13⅝ | $ | 11,467,850 | $50 | Producers & Refiners | ..... | Sept. 15, 25 | 1,200 | 14½ | 14½ | 13⅜ | 13⅜ | —1⅛ |
| 47⅜ | 27 | 35 | 32½ | | 2,845,350 | 50 | do pfd | ..... | May 1, 25 | ..... | ..... | ..... | ..... | ..... | ..... |
| 33¾ | 25⅜ | 31 | 27½ | | 75,959,250 | 25 | Pure Oil Co | 37½cQ | Mar. 1, 26 | 15,600 | 28⅝ | 28¾ | 27½ | 27⅜ | — ¼ |
| 108½ | 103 | 111¼ | 107 | | 13,000,000 | 100 | do 8% pfd | $2Q | Oct. 1, 25 | 500 | 110 | 111¼ | 110 | 111¼ | +3⅛ |
| 57¾ | 48¼ | 57¾ | 52¾ | (sh) | 773,883 | 13.40 | Royal Dutch, N. Y. shares | $1.339 | Jan. 29, 26 | 3,100 | 53¾ | 53¾ | 52¾ | 52⅞ | —2 |
| 49 | 39½ | 48¾ | 45¾ | (sh) | 93,599 | £2 | Shell Transport & T | 96⅜c | Jan. 22, 26 | ..... | ..... | ..... | ..... | ..... | ..... |
| 28¾ | 21⅝ | 28⅜ | 25⅜ | (sh) | 10,000,000 | N.P. | Shell Union Oil | 35cQ | Dec. 31, 25 | 14,800 | 26½ | 26¾ | 25½ | 25¾ | —1 |
| 106½ | 99⅜ | 106½ | 103½ | $ | 20,000,000 | $100 | do pfd | $1½Q | Feb. 15, 26 | 100 | 104¾ | 104¾ | 104¾ | 104¾ | 0 |
| 28½ | 17¾ | 28⅝ | 23¾ | | 7,207,620 | 10 | Simms Petroleum | 50cS.A. | Jan. 2, 26 | 16,800 | 26 | 26 | 24½ | 24 | —2 |
| 24⅞ | 17 | 24⅞ | 20½ | (sh) | 4,489,320 | N.P. | Sinclair Consolidated | ..... | May 31, 24 | 89,100 | 24¾ | 24⅞ | 23¼ | 23¾ | — ⅜ |
| 94⅜ | 78¾ | 95 | 91 | $ | 17,852,200 | $100 | do pfd | $2Q | Feb. 15, 26 | 700 | 95 | 95 | 93¾ | 94¼ | — ¾ |
| 32½ | 21¾ | 32⅜ | 29½ | | 23,024,590 | 25 | Skelly Oil Co | 50cQ | Dec. 15, 25 | 9,000 | 30⅜ | 31¼ | 29⅜ | 29½ | —1½ |
| 67¼ | 51½ | 62¼ | 55⅛ | | 237,610,350 | 25 | S. O. California | 50cQ | Dec. 15, 25 | 28,400 | 58¾ | 58¾ | 55¼ | 56¼ | —1⅝ |
| 47½ | 38¾ | 46¾ | 42 | | 513,456,025 | 25 | S. O. New Jersey | 25cQ | Dec. 15, 25 | 51,100 | 44⅛ | 44⅞ | x42 | 42 | —2⅛ |
| 119 | 116¼ | 118¾ | 116¼ | | 199,972,900 | 100 | do pfd | $1¾Q | Dec. 15, 25 | 2,200 | 118½ | 118⅜ | x116¼ | 117¼ | — ¾ |
| 43⅞ | 38⅛ | 41⅝ | 36½ | (sh) | 1,103,776 | N.P. | Sun Oil | 25cQ | Dec. 15, 25 | 600 | 37¾ | 37¾ | 36⅜ | 36⅜ | —1¼ |
| 6⅜ | 2 | 4¼ | 2⅝ | (sh) | 1,121,368 | N.P. | Superior Oil Corp | ..... | Dec. 20, 20 | 4,000 | 3⅛ | 3⅛ | 2½ | 2½ | — ⅜ |
| 55 | 42¾ | 54 | 50¾ | $ | 164,450,000 | $25 | The Texas Co | 75cQ | Dec. 31, 25 | 20,000 | 52¼ | 52¾ | 51¾ | 52 | 0 |
| 23⅛ | 10⅞ | 19½ | 14⅜ | | 8,380,340 | 10 | Texas Pacific Coal & Oil | ..... | June 30, 25 | 11,400 | 15¾ | 15¾ | 14⅜ | 14¾ | —1½ |
| 36⅞ | 30¼ | 39¾ | 34¼ | (sh) | 2,018,231 | N.P. | Tide Water Oil Co | 25cQ | Dec. 31, 25 | 18,200 | 38 | 38 | 36⅛ | 37½ | — ⅛ |
| 101 | 99 | 103 | 97 | $ | 25,042,000 | $100 | do 5% pfd | $1.25Q | Feb. 15, 26 | 2,300 | 100¾ | 100¾ | 97½ | 97½ | —3⅛ |
| 5⅞ | 3½ | 4¾ | 3¾ | (sh) | 3,742,029 | N.P. | Transcontinental Oil | ..... | ..... | 16,300 | 4 | 4⅛ | 3¾ | 3⅞ | — ⅛ |
| 43⅜ | 33 | 46 | 37¼ | $ | 40,480,800 | $25 | Union Oil of California | 50cQ | Feb. 10, 26 | 28,400 | 43¾ | 43¾ | 41⅜ | 41⅜ | —2⅜ |
| 134 | 96¼ | 94 | 80 | | 24,423,300 | 100 | Union Tank Car Co | $1¼Q | Mar. 1, 26 | 2,400 | 89⅛ | 89⅛ | 85 | 88 | —2 |
| 117½ | 113¾ | 116½ | 113¾ | | 12,000,000 | 100 | do pfd | $1¾Q | Mar. 1, 25 | 700 | 114¾ | 114¾ | 113¾ | 113¾ | —1 |
| 31¾ | 25½ | 29¾ | 26¼ | (sh) | 490,000 | N.P. | White Eagle Oil & Refining | 50cQ | Jan. 20, 26 | 2,700 | 28½ | 28½ | 27½ | 27½ | —1 |

*New High  †New Low  xEx-dividend  Total Sales 844,900

# Standard Oil Stock Traded In New York Curb Market

| 1925 High | 1925 Low | 1926 High | 1926 Low | Outstanding Capital | Par Value | Stocks | Div. Rate | Last Paid | Transactions week ended Feb. 26 Sales | First | High | Low | Last | Ch'ge |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26⅝ | 17¼ | 19¾ | 17¼ | £ 4,000,000 | £1 | Anglo American | $2.4cS.A. | Jan. 4, 26 | 200 | 17¾ | 17¾ | 17¼ | 17¾ | 1¾ |
| 4¼ | 1⅜ | 2¼ | 2 | (sh) 500,000 | N.P. | Atlantic Lobos | ..... | ..... | 900 | 2 | 2⅜ | 2 | 2⅜ | 0 |
| 12⅜ | 3 | 4½ | 3¾ | $ 10,000,000 | $10 | do pfd | ..... | ..... | 400 | 4 | 4½ | 4 | 4⅜ | 0 |
| 240 | 205 | 248 | 226 | 1,000,000 | 100 | Borne Scrymser | ‡$4S.A. | Oct. 15, 25 | 190 | 233 | 248 | 233 | 245 | +14 |
| 72 | 53½ | 59½ | 55¼ | 10,000,000 | 50 | Buckeye Pipe Line | $1Q | Feb. 1, 26 | 200 | 56½ | 56½ | 56½ | 56¼ | —1½ |
| 74 | 48½ | 73¼ | 65 | 3,000,000 | 25 | Chesebrough Mfg | 62½cQ | Dec. 29, 25 | 700 | 72½ | 73¾ | 71 | 71 | — ¾ |
| 115 | 110 | ..... | ..... | 1,000,000 | 100 | do pfd | $1¾Q | Dec. 31, 26 | ..... | ..... | ..... | ..... | ..... | ..... |
| 31½ | 21⅜ | 25⅞ | 22⅜ | 34,914,280 | 10 | Continental Oil | 25cQ | Dec. 15, 25 | 25,700 | 23 | 23½ | 22¾ | 22¾ | — ⅛ |
| 17½ | 10 | 16 | 15½ | 1,500,000 | 25 | Crescent Pipe Line | ..... | Sept. 15, 23 | 100 | 15½ | 15½ | 15½ | 15½ | — ½ |
| 136 | 132 | 137 | 132 | 3,000,000 | 100 | Cumberland Pipe Line | $3Q | Dec. 15, 25 | 50 | 136½ | 136½ | x132 | 132 | —4 |
| 96 | 61 | 68¾ | 59 | 5,000,000 | 100 | Eureka Pipe Line | $1Q | Feb. 1, 26 | ..... | ..... | ..... | ..... | ..... | ..... |
| 68½ | 23½ | 32½ | 27 | 16,000,000 | 100 | Galena Signal Oil | ..... | June 30, 25 | 350 | 28 | 28½ | 27¾ | 27¾ | + ¾ |
| 105 | 88 | 94½ | 83 | 4,000,000 | 100 | do new pfd | $2Q | Dec. 31, 25 | 50 | 84 | 84 | 83 | 83 | —4 |
| 114 | 95 | 97½ | 92½ | 2,000,000 | 100 | do old pfd | $2Q | Dec. 31, 25 | ..... | ..... | ..... | ..... | ..... | ..... |
| 95 | 42¾ | 99¾ | 87¾ | 43,750,000 | 25 | Humble Oil & Refining | 30cQ | Jan. 1, 26 | 14,900 | 91½ | 92 | 89 | 89 | —2½ |
| 154½ | 127 | 142 | 134¾ | 20,000,000 | 100 | Illinois Pipe Line | $6S.A. | Dec. 31, 25 | 60 | 135½ | 136½ | 135½ | 136½ | +1¾ |
| 39¼ | 27¼ | 38¾ | 34½ | (sh) 6,491,852 | N.P. | Imperial of Canada (new) | 25cQ | Mar. 1, 26 | 9,700 | 36 | 36¾ | 34½ | 34½ | —1¾ |
| 84 | 57⅜ | 66 | 58 | $ 5,000,000 | 50 | Indiana Pipe Line | $1Q | Feb. 15, 26 | 200 | 64½ | 66 | 64½ | 66 | +2 |
| 35⅛ | 22⅜ | 35½ | 32⅛ | (sh) 7,118,138 | N.P. | International Petroleum | 25c | Feb. 15, 26 | 16,500 | 34 | 34½ | 32¾ | 32½ | —1¾ |
| 25⅜ | 16½ | 20⅜ | 18 | $ 6,362,500 | $12½ | National Transit | 25cS.A. | Dec. 15, 25 | 200 | 18¾ | 18¾ | 18¼ | 18¾ | — ¾ |
| 79 | 49¼ | 50 | 39 | 5,000,000 | 100 | New York Transit | 75cQ | Jan. 15, 26 | ..... | ..... | ..... | ..... | ..... | ..... |
| 88 | 67½ | 80½ | 70¾ | 4,000,000 | 100 | Northern Pipe Line | $8S.A. | Jan. 1, 26 | 100 | 77½ | 77½ | x77½ | 77½ | + ½ |
| 75¼ | 60¼ | 67⅜ | 61¼ | 60,000,000 | 25 | Ohio Oil Co | 50cQ | Dec. 31, 25 | 1,100 | 64 | 64½ | x61¾ | 61¾ | —2⅜ |
| 44½ | 19 | 25 | 16¼ | 10,000,000 | 25 | Penn Mex Fuel | 50c | May 21, 25 | 400 | 18 | 20 | 18 | 18 | —1 |
| 65½ | 45⅞ | 60¼ | 55 | 60,000,000 | 25 | Prairie Oil & Gas | ..... | July 31, 25 | 15,900 | 57 | 58¾ | 55¾ | 55¼ | —1⅞ |
| 129¾ | 106 | 127 | 123¼ | 81,000,000 | 100 | Prairie Pipe Line | $2Q | Jan. 30, 26 | 600 | 125¾ | 125¾ | 125½ | 125½ | 0 |
| 254 | 200 | 212 | 201¾ | 4,000,000 | 100 | Solar Refining Co | $5S.A. | Dec. 19, 25 | 70 | 204½ | 204½ | 201¾ | 201¾ | —4½ |
| 103 | 63 | 66½ | 61½ | 10,000,000 | 100 | Southern Pipe Line Co | $1Q | Mar. 1, 26 | 250 | 63 | 63 | 62¾ | 63 | 0 |
| 197 | 139 | 197 | 169 | 20,000,000 | 100 | South Penn Oil Co | $1.50 | Dec. 31, 25 | 250 | 175 | 175 | 169 | 169 | —6 |
| 47½ | 45 | 50 | 43¾ | 20,000,000 | 25 | do new | ..... | ..... | 106 | 43¾ | 43¾ | 43¾ | 43¾ | — ½ |
| 84 | 50 | 54½ | 52½ | 3,500,000 | 100 | South West Pa. Pipe Line | $1Q | Dec. 31, 25 | 50 | 53½ | 53½ | 53½ | 53½ | + ½ |
| ..... | ..... | 58¾ | 54½ | (sh) 15,000,000 | N.P. | S. O. California (new) | ..... | ..... | 25,800 | 56⅞ | 57¼ | 55¼ | 55¾ | —1⅛ |
| 70¾ | 59½ | 70½ | 64⅝ | $ 223,756,258 | $25 | S. O. Indiana | 62½cQ | Dec. 15, 25 | 26,400 | 65⅞ | 66¾ | 64½ | 64½ | —2½ |
| 46 | 30⅝ | 36⅝ | 31½ | 8,000,000 | 25 | S. O. Kansas | ..... | June 16, 24 | 1,200 | 32 | 32¾ | 31⅜ | 31½ | — ½ |
| 137 | 114¾ | 134⅜ | 119 | 16,864,434 | 25 | S. O. Kentucky | $1Q | Mar. 1, 26 | 2,100 | 124 | 124 | 119 | 120½ | —3⅜ |
| 270 | 231 | 254 | 239½ | 3,000,000 | 100 | S. O. Nebraska | $5S.A. | Dec. 19, 25 | 70 | 247 | 247 | 240 | 240 | —7 |
| 48⅝ | 40¾ | 47¼ | 34 | 227,535,300 | 25 | S. O. New York | 35cQ | Dec. 15, 25 | 16,100 | 35⅝ | 35¾ | 34 | 34 | —1⅝ |
| 369 | 338 | 362 | 337 | 14,000,000 | 100 | S. O. Ohio | $2½Q | Jan. 1, 26 | 40 | 345 | 345 | 337 | 337 | —9 |
| 123 | 116 | 118½ | 117 | 7,000,000 | 100 | do pfd | $1¾Q | Mar. 1, 26 | ..... | ..... | ..... | ..... | ..... | ..... |
| 27 | 12 | 23 | 20 | 1,722,931 | 25 | Swan-Finch Co | ..... | Nov. 1, 19 | ..... | ..... | ..... | ..... | ..... | ..... |
| 109½ | 80¾ | 109¾ | 100⅝ | 61,919,950 | 25 | Vacuum Oil Co | 50cQ | Dec. 19, 25 | 8,400 | 103⅞ | 103⅞ | x100½ | 100½ | —2½ |

Borne Scrymser $2 extra April 15 $4 extra Oct. 15  ‡Vacuum 50c extra Mar. 20, June 20, Sept. 19 Dec. 19  Dec. 19 special $1 Dec 19 S.O. Neb. $10 extra Dec. 19 special $1 Dec. 19 S. O. Neb. $10 extra Dec. 19 Ohio Oil 50c extra Dec. 31. Chesebrough 62½c extra Dec. 29

## Financial Notes

**Caddo Central Oil & Refining Co.**—Common stock stricken from New York Stock Exchange list.

**Amerada Corp.**—Temporary interchangeable certificates for 713,300 no par common shares listed on New York Stock Exchange.

**Associated Oil Co.**—$4.000.000 additional common stock, par $50 per share, listed on New York Stock Exchange, making total listing $60,000,000.

**Louisiana Oil Refining Co.**—Temporary certificates for $4,000.000 6½% cumulative convertible preferred stock and 1,140,063 shares of common stock, no par value, listed on New York Stock Exchange. Old common stock is to be stricken from exchange list March 8. Authority also given to add 160,000 shares of common stock to listing.

**Union Oil Co. of California**—All directors re-elected at annual meeting.

**Pan American Petroleum & Transport Co.**—F. H. Wickett, chairman, announced that preliminary report for 1925 showed net profit of approximately $27,000,000, an increase of about $12,000,000 or 80 per cent over 1924.


STANDARD
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ISSUES

**CARL H. PFORZHEIMER & CO**

Specialists in Standard Oil and Miscellaneous oil securities

25 Broad St. New York


## New York Bonds

Week Ending Feb. 26

| | High | Low | Last | Ch'ge |
|---|---|---|---|---|
| Amer Rep Cor Deb 5s.. | 99¼ | 99⅛ | 99¼ | + ¼ |
| Associated Oil gold 6s.. | 102¾ | 102⅝ | 102⅝ | — ⅛ |
| Atlantic Refg deb 5s... | 100½ | 100 | 100 | — ½ |
| Barnsdall Corp 6s..... | 100¾ | 100 | 100 | — ¼ |
| Calif Petrol sf 6½s..... | 104¼ | 104 | 104 | — ¼ |
| Empire Gas & F 7½s... | 102½ | 102¼ | 102¼ | — ¼ |
| Gen Asphalt 6s..... | 105 | 104¾ | 105 | — ¾ |
| Humble Oil & R 5½s... | 102⅝ | 102 | 102 | — ½ |
| Mid-Cont Pet 6½s..... | 103¾ | 102 | 102 | —1 |
| Pan-Amer P & T 7s... | 106¼ | 105¾ | 106 | — ¼ |
| Pan-Amer P & T 6s... | 106¾ | 105¾ | 105⅞ | — ⅜ |
| Sinclair Con Oil col 7s.. | 97 | 95¾ | 96¼ | — ¾ |
| Sinclair Con Oil con 6½s. | 90¾ | 90 | 90⅛ | — ⅛ |
| Sinclair Con Oil 6s.... | 113⅜ | 110⅝ | 110⅝ | —2⅜ |
| Sinclair Crude Oil 6s.. | 101 | 100¼ | 100¾ | 0 |
| Sinclair Pipe Line sf 5s. | 90⅝ | 89⅞ | 89⅞ | — ⅞ |
| Skelly Oil 6½s..... | 124½ | 121 | 121 | —4 |
| Union Oil of Calif 6s.. | 105¼ | 105¼ | 105¼ | + ¼ |
| Union Oil of Calif 5s-C. | 96⅞ | 96¾ | 96¾ | 0 |

## New York Curb Bonds

Week Ending Feb. 26

| | High | Low | Last | Ch'ge |
|---|---|---|---|---|
| Atl Gulf & W I 5s..... | 74 | 73½ | 74 | +1 |
| Cities Service 6s..... | 93½ | 93⅛ | 93⅛ | 0 |
| Cities Service 6s new.. | 93¾ | 93¼ | 93¾ | + ½ |
| Cities Service 7s "B".. | 185 | 185 | 185 | +4½ |
| Cities Service 7s "C".. | 130 | 128⅝ | 129½ | +2 |
| Cities Service 7s "D".. | 103¾ | 102⅝ | 103⅛ | +1 |
| Cities Service 8s "E".. | 109⅝ | 109 | 109 | 0 |
| Galena S O 7s..... | 103 | 102½ | 102½ | — ½ |
| General Pet 6s..... | 101¾ | 101½ | 101⅝ | + ⅛ |
| General Pet 5s..... | 94½ | 94 | 94¼ | 0 |
| Gulf Oil 5s..... | 100 | 99⅝ | 99⅝ | — ⅛ |
| Indep Oil & Gas 6½s.. | 100⅜ | 100 | 100 | — ⅜ |
| Pan-Amer Petrol 6s... | 103 | 102½ | 102¾ | — ⅛ |
| Pure Oil 6½s..... | 103¼ | 103 | 103⅛ | — ¼ |
| S O N Y 6½s..... | 106½ | 106½ | 106½ | 0 |
| Sun Oil 5½s '25..... | 99¾ | 99⅝ | 99¾ | 0 |
| Tidal Osage 7s..... | 104½ | 104 | 104¼ | + ¼ |
| Trans Cont Oil 7s..... | 95¼ | 95 | 95¼ | + ¼ |
| United Oil Prod 8s.... | 45 | 45 | 45 | +1 |
| Vacuum Oil 7s..... | 104⅜ | 104⅛ | 104⅛ | — ¼ |

## New York Curb Market

| 1925 High | 1925 Low | 1926 High | 1926 Low | Par Value | Stocks | Transactions week ended Feb. 26 Sales | First | High | Low | Last | Ch'ge |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11½ | 2½ | 14½ | 7¾ | ... | Amer. Maracaibo.. | 8,000 | 9⅛ | 9¼ | 8½ | 8¾ | — ⅛ |
| 8¾ | 5 | 6¾ | 6 | $10 | Arkansas Nat. Gas. | 1,100 | 6 | 6⅛ | 6 | 6⅛ | 0 |
| ..... | ..... | 19¼ | 18 | N.P. | Beacon Oil..... | 5,000 | 18¼ | 19¼ | †18 | 18 | — ¼ |
| 47½ | 38 | ..... | ..... | $25 | British-American... | ..... | ..... | ..... | ..... | ..... | ..... |
| 10¼ | 2¾ | 22⅞ | 10 | 25c | Carib. Syndicate... | 103,200 | 18¾ | 19⅝ | 16½ | 17 | —2 |
| 43 | 35 | 42⅛ | 37½ | $20 | Cities Service..... | 53,100 | 39¾ | *42⅛ | 39⅝ | 41¼ | +1⅝ |
| 85⅝ | 80¼ | 84 | 83¼ | 100 | do pfd..... | 2,100 | 83¾ | 83¾ | †83⅛ | 83¼ | — ½ |
| 8 | 7¼ | 7½ | 7⅜ | 10 | do pfd. B..... | 300 | 7⅜ | 7⅜ | † 7⅜ | 7⅜ | — ⅛ |
| 21⅜ | 17½ | 20 | 19 | 10 | do bankers' sh... | 100 | 19¾ | *20 | 20 | 20 | + ¾ |
| 2¾ | .60 | 3½ | 2 1/16 | N.P. | Colombia Syndicate | 36,200 | 2 1/16 | 3 1/16 | 2½ | 2¾ | — 1/16 |
| 15 | 8¼ | 15¼ | 12 | N.P. | Creole Syndicate... | 3,400 | 12⅜ | 12¾ | †12 | 12 | —1 |
| 12¼ | 5 | 7⅜ | 3½ | N.P. | Crown Central..... | 2,200 | 3¾ | 4⅛ | † 3½ | 3⅜ | — ⅛ |
| 7 | 2 | 3¾ | 2 | N.P. | Derby Oil & Ref... | 400 | 2¼ | 2½ | † 2 | 2 | 0 |
| 27 | 10½ | 14⅞ | 13½ | N.P. | do pfd..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 6 | 1¾ | 7 | 4½ | N.P. | Gibson Oil..... | 18,100 | 5⅞ | 6¼ | † 4½ | 4⅞ | —1 |
| 3¾ | 1¾ | 2 | 1 | N.P. | Gilliland v.t.c..... | 100 | 1 | 1 | 1 | 1 | 0 |
| 98¼ | 63½ | 98¾ | 85 | $25 | Gulf Oil Corp..... | 4,400 | 88¼ | 88¾ | †85 | 85 | —2½ |
| 5⅞ | 2¼ | 3⅜ | 2¼ | N.P. | Kirby Petroleum... | 1,200 | 2⅞ | 2⅞ | 2¾ | 2¾ | + ⅛ |
| 23¼ | 17⅜ | 25⅞ | 19⅝ | N.P. | Lago Oil & Trans. A | 76,900 | 23 | 23 | †19⅝ | 20⅛ | —3⅛ |
| 11¾ | 4⅝ | 18 | 10¼ | N.P. | Lago Petroleum.... | 10,000 | 11⅝ | 11⅝ | †10¼ | 10¼ | —1¼ |
| 18 | 6 | 12¼ | 9 | N.P. | Leonard Oil & Dev. | 30,000 | 11⅞ | 12 | 10½ | 10½ | —1½ |
| 25⅞ | 18 | 25¾ | 23¾ | N.P. | Lion Oil Refining... | 2,000 | 25¾ | *25¾ | 24 | 24 | —1½ |
| 4¼ | 1¾ | ..... | ..... | N.P. | Marland of Mexico. | ..... | ..... | ..... | ..... | ..... | ..... |
| 5¾ | .56 | 5½ | 4¾ | $10 | Mexican-Panuco... | 9,800 | 5 | 5 | † 4¾ | 4⅞ | — ⅛ |
| 2 | 1 | 1¾ | 1⅜ | 1 | Mountain & Gulf... | 1,500 | 1⅝ | 1⅝ | 1⅝ | 1⅝ | 0 |
| 26¼ | 18¾ | 26 | 23¾ | 10 | Mountain Prod..... | 7,500 | 25 | 25 | 24⅜ | 24⅜ | — ⅝ |
| 6¾ | 3⅝ | 6¾ | 6 | 5 | New Bradford..... | 3,400 | 6⅝ | 6⅝ | 6½ | 6½ | — ⅛ |
| 24¾ | 16½ | 5 | 4 | 10 | New England Fuel.. | 400 | 4 | 5 | †4 | 5 | + ½ |
| 19¾ | 6¼ | 17 | 12¼ | 1 | New Mex. & Ariz... | 6,800 | 13½ | 15⅛ | 13½ | 14 | + ½ |
| 12½ | 8¼ | 17 | 11⅝ | 25 | New York Oil..... | 400 | 13⅛ | 13⅛ | 12¾ | 12⅞ | — ⅛ |
| 37 | 14 | 36 | 34¼ | 25 | Ohio Fuel Corp.... | ..... | ..... | ..... | ..... | ..... | ..... |
| 2½ | .90 | 2¾ | 1¾ | N.P. | Peer Oil Corp..... | 5,400 | 1½ | 1½ | 1⅛ | 1½ | 0 |
| 28¼ | 16 | 22¾ | 20¾ | $10 | Pennok Oil..... | 500 | 21 | 21 | †20¾ | 20¾ | — ¼ |
| 44½ | 16 | 21¼ | 16¼ | 25 | Red Bank Oil..... | 100 | 16¼ | 16¼ | †16¼ | 16¼ | —1⅜ |
| 33½ | 19 | 24⅞ | 14½ | N.P. | Reiter-Foster..... | 1,400 | 18½ | 18½ | 17½ | 18 | 0 |
| 9½ | 3½ | 7½ | 5⅜ | N.P. | Ryan Consolidated. | 2,800 | 6¾ | 6⅞ | 6¼ | 6⅜ | — ⅜ |
| 9¾ | 6⅜ | 10 | 9 | $10 | Salt Creek Cons.... | 1,200 | 9⅞ | 10 | 9⅜ | 9⅝ | — ⅜ |
| 35 | 24 | 36 | 31¼ | 10 | Salt Creek Prod.... | 5,100 | 32¼ | 32⅜ | †31¼ | 31¼ | —1 |
| 3⅞ | 1 | 2 | 1⅜ | 5 | Savoy Oil..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 13¾ | 9 | 10 | 9 | 10 | Tidal Osage ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 10⅞ | 8 | 10 | 9 | 10 | do non-voting... | ..... | ..... | ..... | ..... | ..... | ..... |
| 4⅞ | 1¾ | 8 | 4¼ | 5 | Venezuelan Pet.... | 40,300 | 7¼ | 7⅞ | 7 | 7½ | + ¼ |
| ..... | ..... | 29¾ | 24⅞ | ... | Warner-Quinlan w.i. | 1,200 | 27¼ | 27½ | 26 | 26 | —1½ |
| 31¼ | 22⅛ | 27⅜ | 25 | N.P. | Wilcox O. & G. new. | 400 | 26 | 26¼ | 25½ | 25½ | — ⅛ |
| 7 | 3⅞ | 6 | 5¼ | N.P. | Woodley Petroleum. | 200 | 6 | 6 | 6 | 6 | 0 |

## Pittsburgh Stock Exchange

| 1925 High | 1925 Low | 1926 High | 1926 Low | Par Value | Stocks | Transactions Week Ended Feb. 26 Sales | First | High | Low | Last | Ch'ge |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 8¼ | 5¼ | 7 | 6 | $10 | Arkansas Nat. Gas.. | 5,385 | 6⅜ | 6⅜ | 6 | 6 | 0 |
| 73¼ | 69¼ | ..... | ..... | N.P. | Columbia Gas..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 18 | 14½ | 17 | 15½ | $10 | Devonian Oil..... | 575 | 15⅞ | 15⅞ | 15¾ | 15¾ | — ¼ |
| 112⅝ | 105⅛ | 114 | 112¾ | $100 | Duquesne Lt. 7s pfd. | ..... | ..... | ..... | ..... | ..... | ..... |
| 95 | 90 | ..... | ..... | 100 | Fayette County Gas. | ..... | ..... | ..... | ..... | ..... | ..... |
| ..... | ..... | 10 | 9 | .... | HoustonGulfGas(w.i.) | 550 | 9⅛ | 9¼ | †9 | 9 | — ¼ |
| 55 | 32½ | 56⅜ | 51½ | 25 | Lone Star Gas..... | 1,629 | 54¾ | 54¾ | †51½ | 52 | —3 |
| 7 | 3¾ | 6⅛ | 6 | .... | do Rights..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 37⅛ | 31 | 36½ | 35 | 25 | Ohio Fuel Corp..... | 2,511 | 35⅝ | 35⅞ | 35 | 35 | — ⅜ |
| 34 | 28 | 34 | 31½ | 25 | Oklahoma Nat. Gas. | 1,147 | 32 | 32 | 31½ | 31½ | — ½ |
| 8¾ | 5 | 5¾ | 5 | 5 | Pittsburgh O. & G... | ..... | ..... | ..... | ..... | ..... | ..... |
| 9⅝ | 6 | 10 | 9 | 10 | Salt Creek Cons..... | 58 | 9½ | 9½ | 9½ | 9½ | — ½ |
| 13¾ | 8½ | 10 | 9 | 10 | Tidal Osage..... | 10 | 9 | 9 | 9 | 9 | 0 |

## Pittsburgh Curb Market

| 1925 High | 1925 Low | 1926 High | 1926 Low | Par Value | Stocks | Transactions Week Ended Feb. 26 Sales | First | High | Low | Last | Ch'ge |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 18½ | ..... | ..... | .... | Central Ky. Gas.... | ..... | ..... | ..... | ..... | ..... | ..... |
| 2½ | .60 | 3⅛ | 2¾ | $ 5 | Colombia Synd..... | ..... | ..... | ..... | ..... | ..... | ..... |
| .60 | .15 | 15 | 15 | 5 | Duquesne Oil..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 9 | 5½ | ..... | ..... | 10 | Forest Oil..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 92⅜ | 64 | 91½ | 90 | 25 | Gulf Oil Corp..... | ..... | ..... | ..... | ..... | ..... | ..... |
| ..... | ..... | 10 | 6½ | .... | Houston Gulf Gas.. | ..... | ..... | ..... | ..... | ..... | ..... |
| 12⅛ | 3½ | 12 | 9⅝ | N.P. | Leonard Oil & Dvlp. | ..... | ..... | ..... | ..... | ..... | ..... |
| 2¾ | 1⅜ | ..... | ..... | 1 | Oklahoma Eastern.. | ..... | ..... | ..... | ..... | ..... | ..... |
| ¾ | ⅜ | ..... | ..... | .... | Okla. Eastern rts... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1⅜ | 1⅜ | ..... | ..... | .... | Okla. Eastern ex-rts. | ..... | ..... | ..... | ..... | ..... | ..... |
| .47 | .20 | .20 | .20 | 10 | Omar O. & G..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 27½ | 25 | 33 | 27 | 10 | Plymouth Oil..... | 1,700 | 28½ | 29½ | 28½ | 29 | ..... |
| 7 | 3 | 4 | 3 | 5 | States Oil..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 4 | 1⅞ | 3⅝ | 2⅝ | $ 1 | Texon Oil & Land... | 880 | 2 1/16 | 2 1/16 | 2¾ | 2¾ | — ⅛ |
| 11 | 9 | 9½ | 9¼ | 10 | Tidal Osage..... | ..... | ..... | ..... | ..... | ..... | ..... |
| ..... | ..... | 42⅝ | 42 | N.P. | Waverly Oil Wks. A | 100 | 42 | 42 | 42 | 42 | 0 |

*New High ‡New Low xEx Dividend